

FLORIDA HIGHWAYS

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Vol. VII

No. 2



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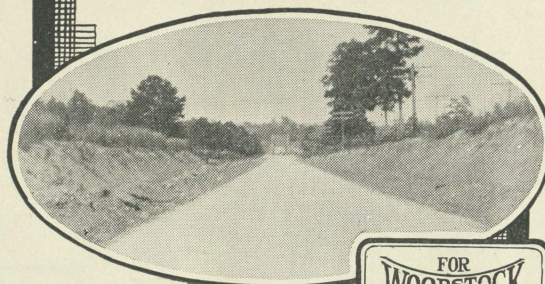
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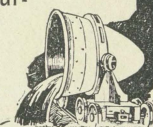
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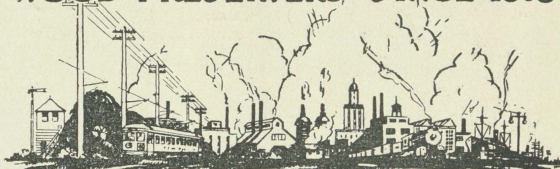
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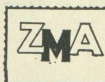
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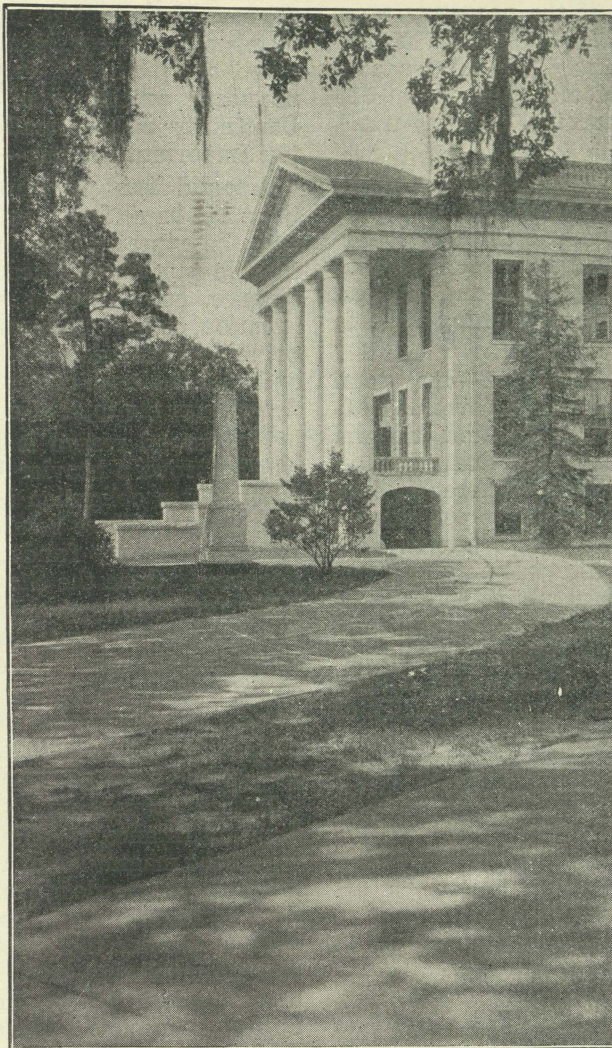


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F L O R I D A

Vol. VII
No. 2



H I G H W A Y S

FEBRUARY
1930

Financing Highways

By THOS. H. MACDONALD, Chief Bureau of Public Roads, Washington, D. C.

THE acid test of a sound highway financing policy is its ability to support with unbroken continuity the two essentials of a successful highway program—the perfect maintenance of existing highways and a reasonable annual expansion of modern highway construction. There is no clean cut line of division between highway financing, highway administration, and highway engineering technique. Each is so intimately related to and dependent upon the other two that they stand, succeed, or fail together.

Public financing, particularly the financing of public works, is of an entirely different character than private financing and much confusion has existed in the public's mind from this fact. The average banking executive, grown wary through contact with relatively short lived corporations and shorter lived individuals, lacks the imagination, initiative, and ex-

perience to plan successful financing of a large and long continuing highway improvement financial policy. Formerly there had to be reliance solely upon faith in the profitableness of highway improvement to induce the undertaking of large expenditures. Now there is needed only a knowledge of results actually secured where faith earlier provided for an extensive program of highway development. No country in the world however, as yet, possesses adequate highways—that is, highway mileage in the amount and of the character of improvement that will be profitable to provide. Most of the nations considering their whole extent and needs, certainly those of the Western Continent, have as yet made scarcely more than a beginning toward a really adequate highway system. There is a slow turning from the old bugaboos and fears of disaster through large public expenditures for high-

ways, and a growing recognition of facts which give confidence in such a policy. Full confidence is justified if a major part of the annual expenditure adds to the permanent investment, if the necessary taxes on property are so reasonable the public is willing to continue them indefinitely, and if the taxes upon the road user are so moderate they do not discourage expansion in the utilization of highway transport.

Since the inevitable result of such policies is an accelerated growth in highway traffic, financial policies must be flexible. Without recourse constantly to legislation the income must automatically increase with the expansion in the use of the highways and the road funds must receive the increase in earnings due to previous expenditures.

For the five-year period—1923-1928—the total funds for rural highways have averaged over \$1,300,000,000 annually. There has been a rather uniform rate of increase and it is probable the total expenditure will continue to increase slowly. There has been a marked change, however, in the relative percentages of income from the various sources. While in 1923 the income from the highway user was only 19.7 per cent of the total—in 1928, after an increase in the total expenditures of 68 per cent, the percentage paid by the road user in motor vehicle license fees and gas taxes constituted 35.4 per cent of the whole, a most convincing demonstration of the earning capacity of improved highways to produce a direct income.

The relative place of rural highway expenditures in the business of government is modest. Of the total income for all government purposes, 15 per cent is used for highways. Activities which require higher expenditures are government itself, education, national defense, and the old debts of war.

Much debate has revolved around the matter of road bonds. While in a few of the States there is not the same urge of necessity that existed a few years ago, yet today every State could issue bonds profitably either for primary road building or some of the integral or auxiliary construction needed, such as grade crossing elimination, by-passing traffic congestion and continuous flow routes, that is, routes without cross traffic hazards and interruptions. That the issuance of bonds is an income producing measure is denied and will no doubt be vigorously contested. Nevertheless, intelligently and scientifically adjusted to the needs of the particular State, the issuance of road bonds affords the only way that public credit can be exchanged for physical properties, improved roads, which are income producing and which do have the ability to pay for themselves. There is not a single valid argument against the issuance of bonds for road improvement as a fiscal matter. It is possible for those seeking public office to secure votes against bonds by capitalizing old prejudices and the characteristic human fear of debt. Certainly in the face of the experience of the States which have made the most rapid progress in road improvement and which have advanced a part of the costs from bonds, there is not a single unfavorable situation or circumstance to support anti-bond arguments. Many of the anti arguments wholly false and wholly unsound economically have nevertheless an appeal so widespread and so ready an acceptance that they may be met only by the most careful survey and analysis of the highway needs, the probable future growth of use and the pos-

sible revenues from all sources, and all combined in a fiscal and improvement plan that takes the public into full confidence. Only when the confidence and support of the public are secured, and it must be remembered this confidence has been more than once given and betrayed, can there be any hope of the necessary continuity of an adequate fiscal policy. Continuity is here made a major consideration for two important reasons—

A sound fiscal plan must be self perpetuating. Since there can be no fixed time when new construction will end, the expected income must provide always a reasonable sum above fixed commitments such as maintenance, bond interest and retirement, and administration costs. This automatically limits the bond principal plus interest which may be retired per year, and with the term of years or life period of the bonds determines the total size of the issue.

The second reason is negative. Any fiscal policy which throws a heavier burden back upon itself and accumulates obligation is not sound and can not be continuous. These results inevitably follow the borrowing of county funds by the State for State road purposes. Once the State has assumed the responsibility for laying out and improving a State road system, the use of county funds and county or other local credit should cease. Such a policy is always more costly and much less efficient. There are now instances of such wastefulness springing from this general cause that the excess and wholly unnecessary cost will equal or exceed the value of the work secured.

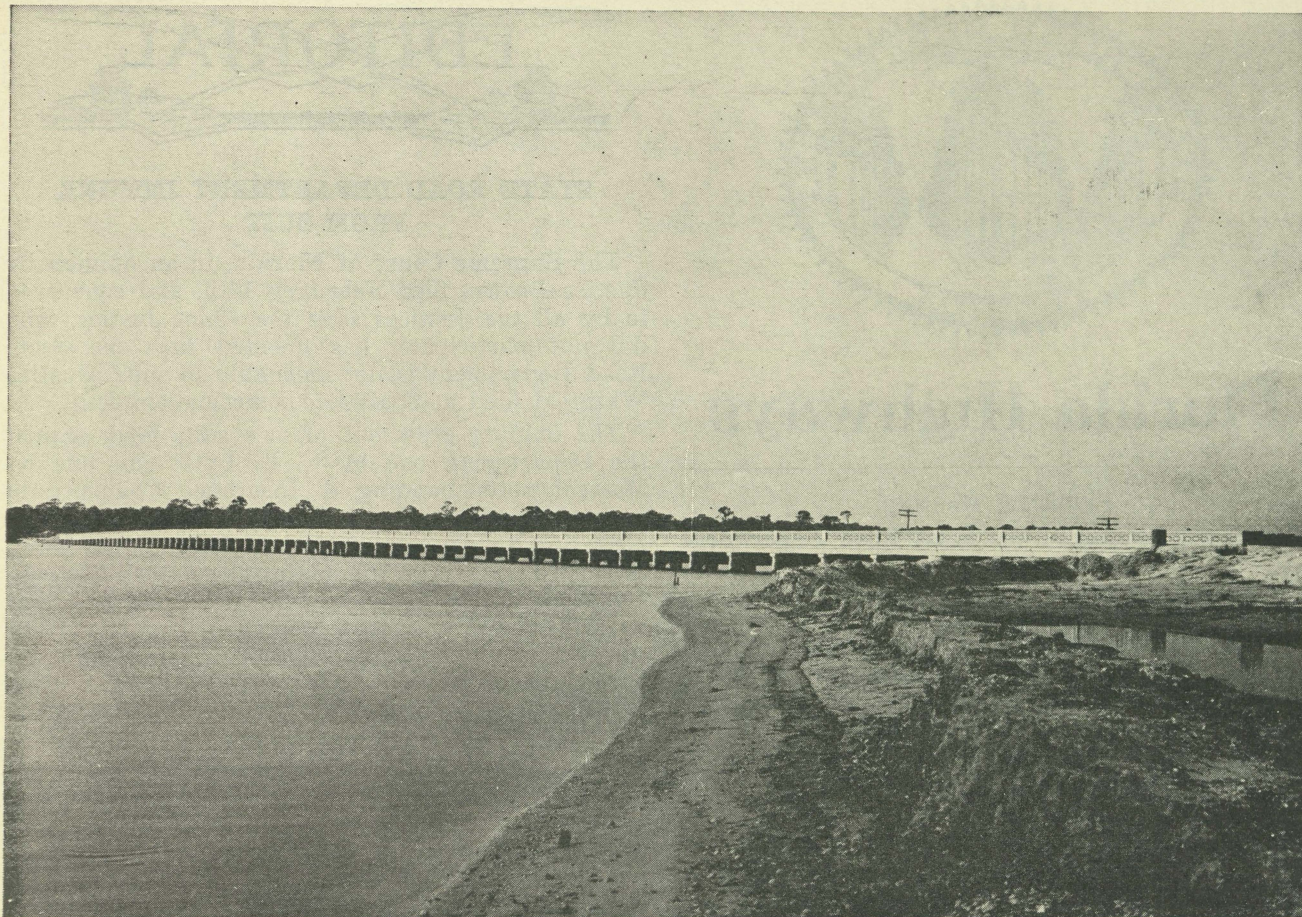
Before attempting to devise a rational plan of highway finance, we should have a clear understanding of the magnitude of the task of highway improvement and a knowledge of what has been and is being done to finance the improvement. I shall try, therefore, to picture the problem from both angles, omitting as much as possible of the complicating details and drawing only the lines that are necessary to an appreciation of the general form.

First let us examine the proportions of the physical job. We find that there are approximately 3,016,000 miles of public rural roads in the United States. Of this total, in 1928, there were 306,000 miles that were included in the State highway system and 2,710,000 miles were under the jurisdiction of county and other local officials.

In 1921, the year of the passage of the Federal Highway Act, the State systems included only 203,000 miles, which was practically equivalent to 7 per cent of the existing total mileage, the limit that was established for the original Federal-aid system. Since 1921 there have been taken into the State systems an additional 103,000 miles, and the extent of these systems at the beginning of the present year was 10.2 per cent of the total road mileage.

The proportions of the State highway program have thus been increased by 50 per cent in a period of seven years, the annual addition averaging nearly 15,000 miles. In this period of seven years only three States have failed to increase the mileage of their State systems; 11 have added less than 500 miles; 9 have added between 500 and 1,000 miles, 7 have added between 1,000 and 2,000 miles; 10 have added between 2,000 and 5,000 miles; and 8 have increased the size of their systems by more than 5,000 miles.

The percentage of the entire road system embraced within the State system on December 31, 1928, varied



Seminole Bridge Over Long Bayou. State Road No. 15, Pinellas County.

from a minimum of 5 to a maximum of 36; the minimum in Oklahoma and South Dakota, the maximum in Rhode Island. Of the three States that have made no addition to their systems, two, Missouri and Oklahoma, still include considerably less than the average percentage of the total mileage; the third, Vermont, has a system which includes 28 per cent of the total road mileage, next to Rhode Island the highest percentage in any State.

Of the eight states that have added more than 5,000 miles in the seven-year period, two—Illinois and Kansas—still include less than the average of 10.2 per cent, the former 10.1 and the latter only 6.7 per cent. Three of this group—Arkansas, Mississippi, and Montana—still include only slightly more than the average percentage, the figures varying from 11.7 to 12.2 per cent. The other three—Kentucky, Louisiana, and New York—by their large additions have increased their respective ratios of State system to total mileage to 18.7, 27.3, and 17.5 per cent, respectively.

Additions to the State highway systems have been made either by legislative enactment or by action of the State highway department under authority vested in them by the legislatures. There can certainly be no reasonable objection to the placing of a greater mileage of the more important roads under the supervision of the State agencies; on the contrary, such transfer from local control is distinctly desirable and must eventually be made. But addition to the State program without corresponding increase of State revenue is not likely to produce a satisfactory result

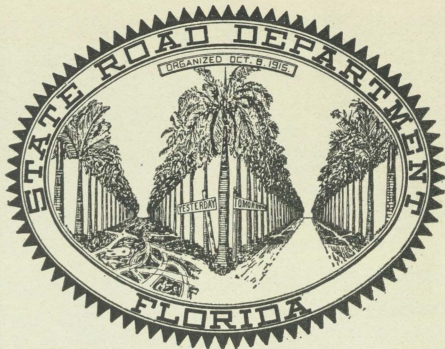
and is decidedly unfair to the State agency which must shoulder the responsibility.

That is precisely what has been done in too many instances; and a study of the mileage and condition of all the State systems in conjunction with the revenues available for their improvement and the demand for improvement as indicated by the motor vehicle registration, must lead to the inevitable conclusion that expediency and enthusiasm have been more influential than sound reason in determining the program of State improvement.

Certainly, when we find two adjoining States of similar area, road mileage, and motor vehicle registration; one with nearly 19 per cent of its total mileage in the State system of which but 45 per cent is surfaced and revenue which will permit an expenditure equivalent to only \$1,200 per mile of the system and the other with only 9 per cent of its road mileage in the State system of which nearly 80 per cent has been surfaced and annual expenditures equivalent to nearly \$3,300 per mile of the system; certainly with these facts before us we are justified in concluding that reasons other than those of sound business economics have been responsible for the difference.

To complete the picture of the physical problem, let us add that of the 306,000 miles in the State systems in 1928, over 113,000 miles, or 37 per cent, were still unsurfaced; 125,000 miles, or 41 per cent, were surfaced with sand-clay, gravel, or macadam; and 68,000 miles, or 22 per cent, were improved with surfaces of bituminous macadam or better. In 1921, of the 203,000

(Turn to Page 5.)



Florida Highways

Published Monthly
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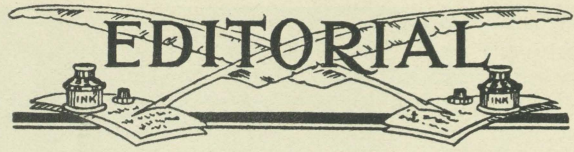
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Volume VII February, 1930 Number 2



STATE ROAD DEPARTMENT IMMUNE FROM SUIT

The Supreme Court of Florida, in an opinion by Justice Brown, filed February 14th, and concurred in by all the Justices save the Chief Justice, who did not participate, has decided that the State Road Department is not amenable to suit. Justice Whitfield filed a separate concurring opinion.

The holding grew out of two suits filed against the Department, one by C. F. Lytle and one by Massachusetts Bonding & Insurance Company in each of which claim was made for additional compensation on contracts for work done by the plaintiffs. The right of the plaintiffs to maintain the actions was attacked by the Department's attorneys on the ground that these constituted suits against the State and that the state had not, by any valid enactment, given consent to such suit. The cases involved the validity of Section 4 of Chapter 9312, Laws of Florida, 1923, which purported to grant authority for suits against the Department on claims arising under contract for work done.

The Court affirmed its former holding that the State Road Department is an agency of the State and a component part of the State Government and held that suits of the kind named would be in effect suits against the State.

They then proceed to a determination of the attacks made on Section 4 and declare that it "must be held null and void and hence incapable of conferring jurisdiction upon the Circuit Court to entertain or adjudicate these suits against the State Road Department. Thus Section 4 may be regarded as eliminated from the Statute."

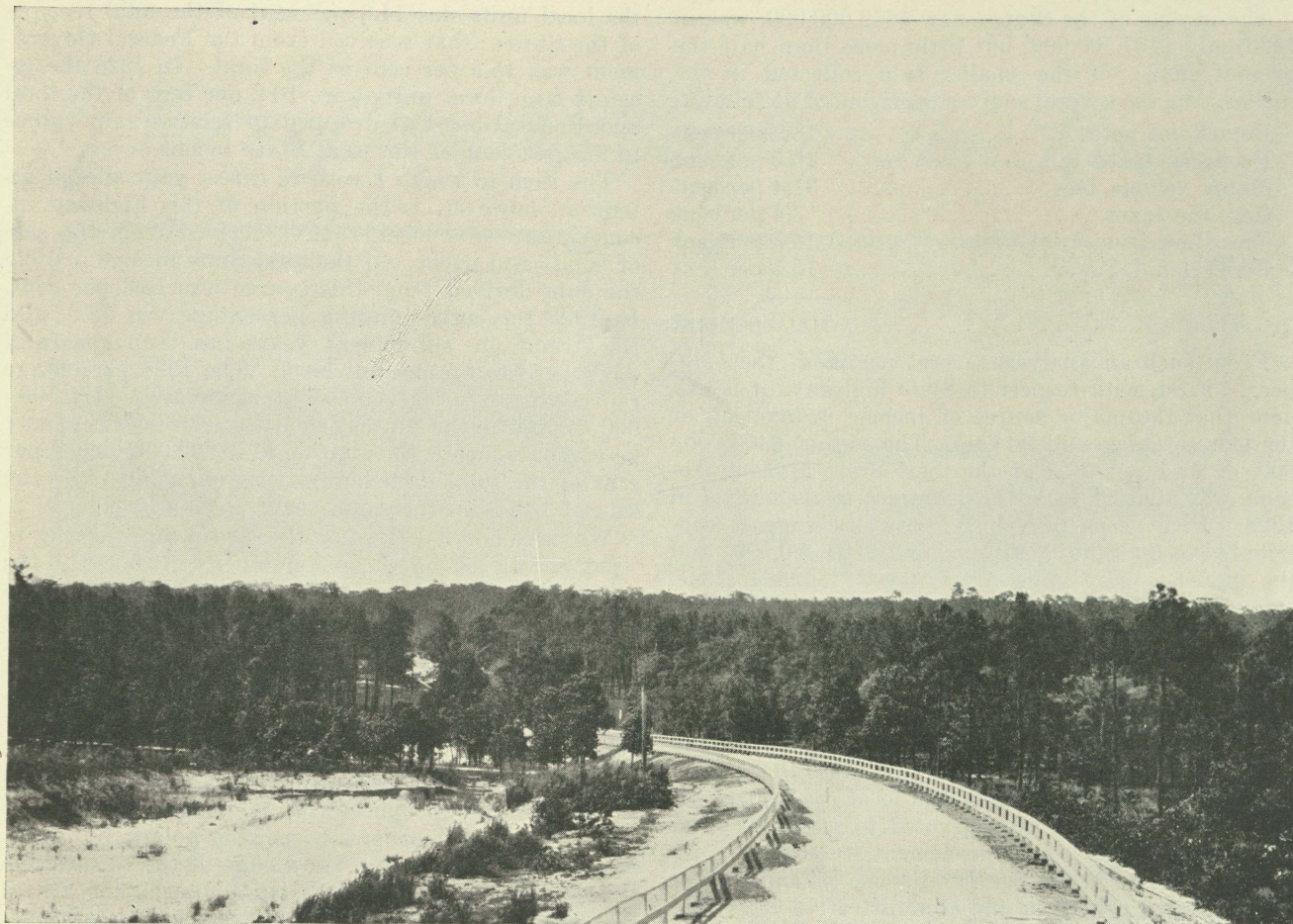
The Court's decision brings to an end a controversy as to the validity of the section in question which has existed since the passage of the act referred to.

THE 1930 BUDGET OF CONSTRUCTION AND MAINTENANCE WORK

As we go to press, the Department is on the eve of holding the statutory hearing of all complaints and suggestions as to its proposed budget of work, a copy of which was presented in our January issue.

The meeting, which is to be held February 25th at Jacksonville, will also take up the award of certain contracts, bids on which were received February 20th.

Under the law which provides for an annual budget of construction and maintenance work, the Department is required to make up such a budget at its first meeting in January, to furnish copies to the Clerks of the several counties, and to make provision for a meeting at which it will hear complaints and suggestions from the public as to such proposed budget. It is the latter meeting which is to be held at Jacksonville, and upon the conclusion of the hearing, the final adoption of the budget, with such changes as may be determined upon, will be made.



State Road No. 5—Looking North from an Overhead Crossing Near Inverness.

FINANCING HIGHWAYS

(Continued from Page 3.)

miles then included in the State system, only 41 per cent was surfaced. In 1928, we find surfaced 63 per cent of the 306,000 miles to which the systems of the States had grown. But there still remains unsurfaced 113,000 miles, or almost as much as the 118,500 miles that were unsurfaced in 1921.

When it is considered that there were 78 motor vehicles for every mile of the enlarged State systems in 1928 and only 50 in 1921 for each mile of the smaller systems, it will be appreciated that the job of the States is still far from finished.

Of the 2,710,000 miles of local roads, 433,000 miles or 16 per cent had been surfaced by the end of last year; but of this surfaced mileage only a little over 34,000 miles, or 8 per cent, was of bituminous macadam or better, a figure that may be compared with the 22 per cent of similar improvements in the State highway systems.

Viewing the roads of the country as a whole, we find that at the end of the year 1928 there was a total surfaced mileage of 626,000 miles of which 193,000, or 30 per cent, were in the State systems; and that of the surfaced total 102,500 miles, or about 16 per cent were improved with surfaces of bituminous macadam or better. Of the surfaces of this higher class, 66 per cent were in the State systems.

Turning now to the financial aspect, we find first that the total expenditure for the improvement of rural roads in 1928 was, in round figures, \$1,660,000,000, of which \$828,000,000 was expended by the

State highway departments and \$832,000,000 by county and other local authorities.

To defray these costs there was available to both State and local authorities income which in varying amounts was derived from the same three general sources; namely, taxes on real property, taxes on motor vehicles and their fuel, and the sale of bonds and notes. In addition, the States drew a portion of their income from Federal aid. A portion of the income drawn from these sources by the States was transferred to the counties and other local units. A portion collected by the local authorities was transferred to the States. Of these transfers it is difficult to ascertain the original source. There are also certain amounts derived by appropriation and certain miscellaneous items the source of which is not entirely clear, but these may be considered as coming in the main from the taxation of property.

With this explanation it is possible to classify the \$849,000,000 of income to the States in 1928 approximately as follows:

From the sale of bonds and notes, 14.3 per cent; from property taxes, 7.9 per cent; from motor vehicle fees, 30.5 per cent; from gasoline taxes, 27.6 per cent; from funds transferred by local authorities, 10.2 per cent; and from Federal aid, 9.5 per cent.

The income of \$835,000,000 accruing for local road purposes in 1928 may be similarly classified as follows:

From the sale of bonds and notes, 18.0 per cent; from property taxes, 65.9 per cent; from motor vehicle fees, 6.0 per cent; from gasoline taxes, 6.4 per cent; and from funds transferred by the State, 3.7 per cent.

The income of the States, now \$849,000,000, was in 1923 only \$467,500,000, but little more than half the present sum. Of the smaller sum collected in the earlier year the several sources contributed as follows:

Bonds and notes.....	18.9 per cent
Property taxes	16.5 per cent
Motor vehicle fees.....	31.4 per cent
Gasoline taxes	3.4 per cent
Transfers from local units.....	14.3 per cent
Federal aid	15.5 per cent

Total 100.0 per cent

From such an analysis several pertinent facts appear. First, with respect to State highways it is evident that the major source of income is taxation of the motor vehicle and its fuel. The sum of \$493,000,000, or 58.1 per cent of the total State highway income was allotted from these sources to the States in 1928. Five years previously the same sources contributed to the State highways only \$163,000,000; and the increase in revenue from these sources alone, amounting as it does to \$330,000,000 for the year, accounts for nearly all of the increase of \$381,800,000 in annual State highway revenue during this 5-year period.

Of the total revenue collected in 1928 from motor vehicle fees and gasoline taxes, a portion was used to defray the expense of collection and administration, a portion was allotted to county and local road purposes, and various portions were devoted to purposes other than rural highway improvement, principally to schools and city streets. If all this revenue, after deducting the collection and administrative costs, had been devoted to the improvement of State highways, the total of \$612,000,000 would have paid three-fourths of the State highway bill of 1928.

It should be noted here, however, that the trend in the use of these funds is not toward their concentration upon State highways but rather in the opposite direction. In 1921 local highway authorities received 23 per cent of the motor vehicle fees allotted to highway purposes. In 1928 the same authorities received 28 per cent of the sum allotted to highways, and the trend in the intervening period has been more or less steadily upward. In 1928 there were allotments from the gasoline tax revenues to purposes foreign to rural highways of some 6 per cent of the total collections, and there is active demand particularly by the cities for the diversion of far greater sums from this source to city streets.

A second fact that stands out from the analysis of the 1928 highway income is that the States depend to only a small extent upon property taxes for the support of State road improvement. It may be assumed that the 7.9 per cent of the total State revenue drawn from this source is fairly representative of the general benefit derived by all property owners from the improvement of the State systems. The counties, on the other hand, obtain from this source nearly two-thirds of their total income.

It is interesting to note that the States receive from the counties and other local units on the one hand and from the Federal Government on the other substantially the same amounts and percentages of their total income. Since 1923 the amounts received from the two sources have varied but slightly and have constituted steadily decreasing percentages of the State income as the motor vehicle revenues have increased in amount. In 1923 the sum received from

the local units was 14.3 per cent of the total receipts of the States; that received from the Federal Government was 15.5 per cent of the total. In 1928 the receipts from local units were 10.2 per cent of the total and Federal aid had dropped in relative importance to 9.5 per cent of the total State income.

The item to which I wish to direct your special attention, however, is the portion of this highway income, State and local, that is derived from the sale of bonds and notes. Of the total State income in 1928 the sum derived from this source was 14.3 per cent. In 1923 the corresponding percentage was 18.9, and the trend in subsequent years has been generally downward to the present level. The 1928 percentage represents an actual sum of approximately \$121,500,000 drawn by the States from this source, which may be compared with the sum of \$150,200,000, or 18 per cent of the total local highway revenue raised by the sale of bonds in the same year.

We have heard so frequently the solemn warning to "pay as you go," and so often have we listened to the tale of woe that impends for those profligate commonwealths that issue bonds, that I fear we may come to believe that there is something peculiarly virtuous in the direct investment of current revenue, and something unspeakably vile in the capitalization of income to create facilities capable of producing greater income.

When fanatical advocates of the pay-as-you-go plan utter their dire prophecies of the disaster that must follow upon the heels of a borrowing policy, I am constrained to doubt by the knowledge of the remarkable benefits that have attended that policy in the States that have made the greatest advances in the improvement of their highways. These gentlemen would have us believe that there are certain commonwealths whose people, preserving the ancient American ideals of honesty and frugality, rigidly refrain from the borrowing of capital for road improvement as a matter of principle. To believe them is to believe that these homely ideals continue to reside in just one of our 48 States, for there is just one—the State of North Dakota—in which thus far there has been no resort to bond issues either for State or local road improvement. If State bond issues alone are immoral, then there are 17 sovereign States that are free of taint, but the other 31 stand convicted by their records.

"Neither a borrower nor a lender be," runs the old adage. It is a rule of finance to which the pay-as-you-go advocates would have us adhere; but if it is really an economic sin to borrow capital for public works, then it must be none the less sinful when the borrowing is done by counties than when it is done by States. To fix the measure of guilt that is to be attributed to the people of each one of 47 guilty States, therefore, we must examine the borrowing record of both the counties and the States. Suppose we do so.

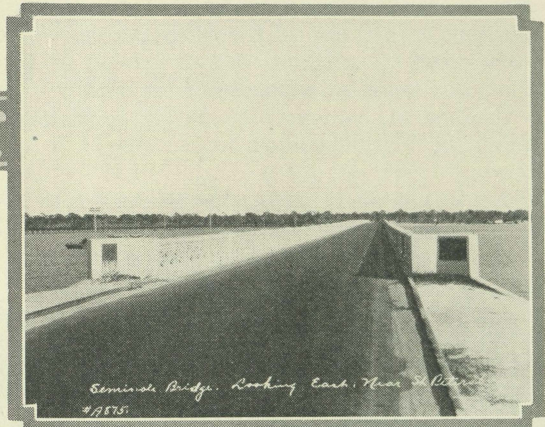
We find, as I have said, that there are 31 States which at some time or other between 1894 and 1928 authorized and issued State highway and bridge bonds. The total of such authorized issues is \$1,391,216,500; but the total thus far issued, including refunding securities, is \$996,226,100, and of this amount there had been retired by the end of the fiscal year 1928, \$103,746,670, leaving an outstanding indebtedness of \$892,479,430. The fact that there were sinking fund accruals which would still further reduce the debt by over \$83,000,000 is scarcely worth mentioning.

(Turn to Page 8.)

Views of Pinellas County's Fine Roads



Cuddeback Bridge, Bay Shore Road.
#A 179.



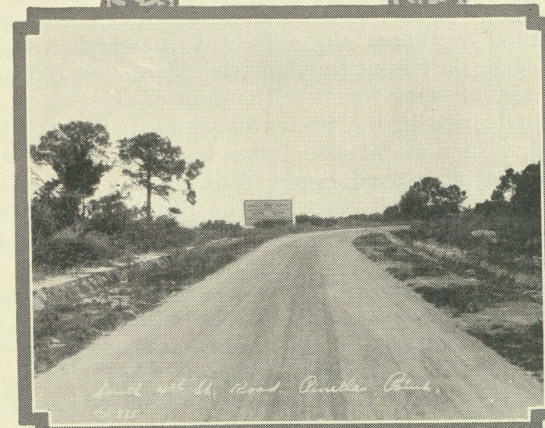
Seminole Bridge. Looking East. Near Pine
#A 185.



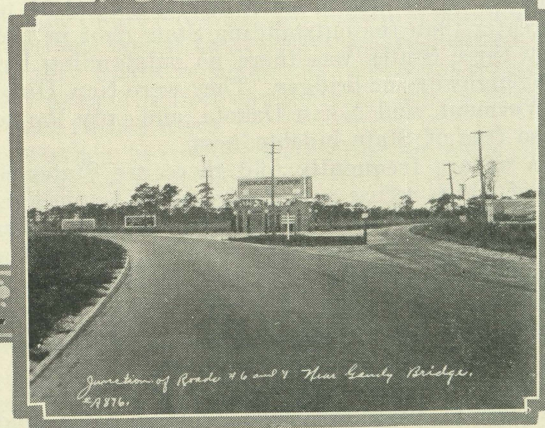
State Road 76 East of Tarpon Springs
#A 189.



Road 46. Between Long and Hardy Bridges.
#A 191.



Road 44. At Road, Cuddeback Bridge.
#A 193.



Junction of Roads 46 and 44 Near Hardy Bridge.
#A 196.



A View of the Famous Gandy Bridge Across Tampa Bay Between Tampa and St. Petersburg. A Privately Owned and Operated Toll Bridge

FINANCING HIGHWAYS

(Continued from Page 6.)

tioning; but I should like to point out in passing that this State highway debt of the 31 States is approximately equivalent to one year's expenditure for State highways by all of the States.

Now let us examine the record of the counties and other local units of government. We have no complete record of the bonds authorized; nor have we a compilation of any sort of later date than 1926. For that year we have a record of the county and local highway and bridge bonds then outstanding, and the total in 45 States was \$1,386,338,683, a total 55 per cent greater than the outstanding State debt in 1928. In only three States was there no outstanding local debt for highways or bridges. They were New Hampshire, Vermont, and North Dakota, and only the last was also free of State indebtedness.

If as we are frequently told there are States the people of which refuse as a matter of principle to incur a public debt, then presumably we should find them among the 17 that have thus far incurred no State debt. We already know that in all but one of these there have been issues of local bonds; but perhaps there have been mere occasional lapses from rectitude. Let us see.

What we find on examining the record further is that in these 17 States that have issued no State bonds the outstanding local issues in 1926 amounted to \$657,072,787; and that the issues outstanding at the same time in the other 31 States amounted to \$729,265,896. In the 17 States there are 1,354,500 miles of local roads; in the 31 there are 1,355,300 miles of

corresponding class. The outstanding local bond issues in the 17 that have issued no State bonds amounted, therefore to \$485 per mile of local road; those outstanding in the other 31 States of less conservative State policy amount to \$540 per mile of local road. If, therefore, it is true that the people of the 17 States do object to the issuance of State bonds, it appears that their objection does not extend to the issuance of county and local bonds. Perhaps they hope to be forgiven of their sin by the payment of the higher rate of interest.

Since there is really so much of this bonding by local units of government even in States that have refrained as States, the only way in which we shall see clearly the extent to which the practice is indulged in, is by throwing together the debt of the States and the local units in the States in which both have borrowed. Then if we also lump together the existing mileage of improved roads built by the States and local units we shall see what the people of these two groups of States have gotten for their more or less reckless borrowing.

We find that the people of the 17 States that have issued no State bonds have 32,066 miles of roads improved with surfaces of bituminous macadam or better to show for their debt of \$657,072,787. For each mile of such high-type road, there is or was in 1926 an outstanding indebtedness of \$20,500 per mile, on every dollar of which they are paying a relatively high rate of interest.

The people of the other 31 States have a combined State and county indebtedness (ignoring the different dates of the records) of \$1,621,745,426, to show for

which they have 70,493 miles of roads with surfaces equal to or better than bituminous macadam. The indebtedness is at the rate of \$23,000 per mile of such high-type roads; and on more than half of it the people are paying a minimum rate of interest.

If it be preferable to compare the debts of these two groups of States on the basis of their total surfaced mileage rather than simply the mileage of high-type surfaces, it is necessary to consider that the improvements in the 31 States are of distinctly higher average type than those of the 17 States. In order to arrive at an average appraisal per mile, it is necessary to apply some uniform scale of value to the known mileage of each type of improvement in each group of States. As to this scale, ideas may differ; but for purposes of illustration we may adopt the following as representing the average capital investment in a mile of the several common types:

Type	Investment per mile
Sand-clay	\$ 8,000
Gravel	10,000
Macadam	15,000
Bituminous macadam	25,000
Bituminous concrete	30,000
Concrete	35,000
Brick	40,000

Applying this scale we find that the average investment in each mile, of the 296,056 miles of State and local surfaced roads in the group of 17 States, is \$12,500 and against each mile there is an average debt of \$2,220. In the group of 31 States the average investment in each mile of the 330,081 miles of State and local surfaced roads is \$15,000, and against each of these miles there is a combined State and local debt of \$4,915. The difference in the indebtedness approximately equals the difference in investment.

Let us now consider the county and local income alone in these two groups of States. We find that the totals for the two groups differ by less than 20 million dollars, being \$446,200,000 approximately in the group of 17 States that have no State bonds, and \$465,000,000 in the group of 31 States that have issued State bonds. The figures are for 1928. When we look to the proportion of this income that was derived from the sale of bonds, we find that in the group of 17 States it was 23 per cent and in the group of 31 it was 15 per cent of the total. In other words, the people who are supposed to oppose bond issues are actually issuing high-interest local bonds in considerably greater proportion to their total local highway income than the people who presumably favor the issuance of bonds.

One more comparison and I am through with these interesting groups of States. I have referred to the transfers of income that take place annually between the States and their local units of government. In the large majority of the States it works both ways. The counties and townships give and receive. The States receive and give. But apparently the local units are generally convinced that it is more blessed to give than to receive. At any rate, the fact is that 33 of the States actually do receive from their local units more than they give in return.

Of the group of 17 States, all but 3 are net beneficiaries by this practice, and the net gain to the States of this group is approximately \$59,200,000. Of the group of 31 states, 20 are similarly benefited by the interchange, although in smaller amount than their

17 sisters. In this group, the net gain to the States is roundly \$16,700,000. Of special interest here is the fact that the gain to the 17 States is 21 per cent of their total State income, and the profit of the 31 States is but 3 per cent of their total income.

The motor vehicle fees and gasoline taxes turned over to the counties are not considered in the foregoing analysis as transfers from the States. Though they are in fact collected by the States they are presumed to belong to the counties by law. However, when you analyze the amount of these returns in the two groups of States, we find that the counties of the group of 17 States get approximately \$52,000,000 of a total of \$219,700,000 available for highway purposes, and those of the group of 31 States get practically the same amount from a total of \$377,800,000. In other words the counties in the group of 17 States get 24 per cent of the total and those of the 31 States get only 14 per cent.

I submit that it all comes down to this: That it is generally true that the States that do not issue State bonds for highway purposes return to the counties a greater proportion of the motor vehicle revenues which the counties use to borrow money at high rates of interest in order to help the State eke out their deficient debt-free income.

I do not wish to be understood as favoring the issuance of bonds under all circumstances. I have said that I believe there are a few States in which there is no longer the need that existed a few years ago for the employment of this method of financing. But I also repeat that every State can still profitably issue bonds for certain purposes, if not for primary highway building, then for grade crossing elimination, or needed bridges, or the provision of additional facilities for the relief of traffic congestion, or for any of the numerous improvements which remain to be accomplished in order to raise the efficiency of highway service to the desirable ultimate.

The outstanding advantages of the bond issue plan may be briefly stated as follows:

1. A rational system of roads economically in need of improvement may be planned and their improvement pushed to completion as rapidly as the physical limitations of plant, equipment, labor and materials will permit.
2. Present low current income may be capitalized for the creation of income-producing facilities which share the payment.
3. The improved roads are built in a minimum time and vehicle operating cost savings are realized sooner than they would be under the pay-as-you-go plan.
4. Payment is more equitably divided between present and future users.
5. Savings in cost of construction are made through ability to let large contracts.
6. The roads produce wealth immediately in excess of the debt they create.
7. Maintenance costs are lowered.

But what of the actual dollars and cents cost of the two methods? If we borrow money we must pay interest. Consequently we pay considerably more than a dollar for every dollar obtained for road construction. Would it not be better to pay the cost directly and so save the additional cost of borrowing? If, without undue burden of taxation the roads can be built as rapidly as it is possible to build them, the answer is "yes." If road service is already reasonably efficient and economical transportation is al-

ready provided for in large degree, the answer is "yes." But these conditions obtain in few of our States.

To illustrate the relative costs of construction by the two methods of financing, and at the same time to show why it is sound economics to pay the additional cost of the bond method in order to speed up construction, let me cite an example based on an actual bond issue, the \$60,000,000 issue voted in Illinois in 1918. The interest rate on these bonds is 4 per cent. Payment of interest began in 1922. Retirement began in 1926. It is planned to complete retirement in 1944 and on this basis the total interest payment will be \$33,200,000. For each dollar borrowed the State will pay \$1.55. The bond issue sold for \$58,496,978 in the years 1921 to 1924, inclusive. The roads built average \$39,394 per mile, and the money realized paid for 1,480 miles which were completed by 1925. Amortization is spread over a period of 23 years, making an average annual payment of \$4,052,200.

Now let us suppose that instead of issuing the bonds this same average annual sum had been used to pay for those roads directly. It would then have taken 15 years to complete the roads which under the bond plan were completed in 5 years. In other words, the 1,480 miles of road were available for an average period of five years under the bond plan before they would have been available under the pay-as-you-go plan.

So much is actual fact. Now we must make one or two assumptions. We will make them conservatively. We must estimate the number of vehicles these 1,480 miles of paved roads would serve for the period of 5 years and the saving in operating cost that would be returned to the operators of these vehicles by the availability of the improved roads. Let us estimate that each mile of these roads will be used every day of the 5 years by an average of only 1,000 vehicles and that the saving to the owners of the vehicles is 1½ cents per mile. Both of these estimates will be considered, I believe, as sufficiently conservative. The result is an estimated saving of \$40,515,000 in operating cost over the 5-year period, by which improved highway service has been advanced, which exceeds the interest cost on the bond issue by \$7,315,000.

There is still more to be said about this bond issue. It was financed exclusively with motor vehicle revenues, and no increase in the rate of motor vehicle taxation was permitted. In 1921, when the first bonds were sold, receipts of motor vehicle revenues amounted to \$6,803,556. In 1928, seven years later, annual receipts had increased to \$15,521,530. In other words, the personal liability of the motor vehicle owners who assumed the debt in 1921 was cut in half by 1928.

The use of motor vehicle revenues to finance bond issues dates from 1913. Prior to that year all issues of State highway bonds were financed from the proceeds of general property taxes. In 1913, Maine began to issue bonds at the rate of \$500,000 a year for highway purposes, the issues to be financed from the proceeds of the motor vehicle tax. The procedure, which came to be known as the "Maine plan," proved its soundness in practice, and other States were quick to adopt it. As a result we find that of all issues authorized between 1894 and 1928, totaling \$1,391,716,500, the sum of \$670,374,000 is being financed either from motor vehicle fees or gasoline taxes or both. Of the remainder, \$14,500,000 are being financed from bridge tolls, and \$706,842,500 from

general State revenues. Of this latter amount, \$300,000,000 is the amount of the New York issue for grade separation purposes, and of the balance of \$406,842,500, half was authorized and issued prior to 1919, when the first gasoline tax measure was adopted.

There can be no question that the employment of motor vehicle revenues to pay for bonds is now the proper procedure.

There is one other question that must be answered to round out a fairly complete picture of the sources of highway income and the present status of highway finance. That is the question as to the relative contributions of those who live in cities and those who live in the country. The statistics which would permit of a complete answer have not been found, but facts are available which are strongly indicative. The current revenue for highway purposes comes from just three principal sources; namely, the Federal Treasury, taxes on real and personal property and taxes on motor vehicles and their fuel. The Federal contribution may here be ignored. It is relatively small and is presumably spread quite generally over the entire population.

As to the contribution of the motor vehicles, we find that according to the estimates compiled by the Farm Journal, the only existing source, 5,427,000 of the 24,493,000 motor vehicles registered in 1928, or 22 per cent of the total were farm-owned. The estimates made annually since 1922 show a steady decline in the percentage of farm ownership. If they may be assumed to be approximately correct, then the contribution of farmers to current highway income through motor vehicle and gasoline taxes is at present not more than 22 per cent of the total of such revenues. As farm-owned vehicles are in general lighter than the average and generally use less gasoline per car than city-owned cars, it is probable that the actual contribution to motor vehicle revenues by farmers is actually less than the 22 per cent indicated by the registration figures.

With respect to the portion of current revenue derived from taxation of property, I have found no complete statistics. Real property is taxed by the State in 43 States. It is taxed by the counties in 46 States. It is from these taxes that the general-tax revenue for highways is derived.

In the State of Ohio, which may not be quite representative of the average, but which is the only source from which I have been able to obtain satisfactory data, I find that 26 per cent of the total valuation of real and personal property is classed as rural, the remaining 74 per cent as urban. The tax revenue is, of course, proportional to the valuation, and the indications are that, in Ohio, at least, rural property pays approximately a quarter of the total general-tax revenue for highways.

Another indication of the possible extent of the respective contributions of rural and urban property is found in the census classification of population. The census of 1920 showed that 51.4 per cent of the total population at that time was urban. The urban percentage of total property value is doubtless higher; and it would probably not be far from correct to say that the average urban percentage is approximately 60 per cent.

If, then, we assume that 20 per cent of the motor vehicle revenues and 40 per cent of the property tax revenues are contributed by persons resident in the country, we find that of the total current highway



Project 669-Z, Road No. 27, Collier County, Between Naples and Marco Junction.

revenues of States and counties, exclusive of Federal aid, approximately 30 per cent is paid by persons who live in the country and 70 per cent by persons who live in cities and towns. The corresponding percentages of current State highway revenue are:

Rural	22 per cent
Urban	78 per cent

For current local highway revenue they are:

Rural	37 per cent
Urban	63 per cent

From this review of the general status and character of highway finance in the United States, I think we may draw certain rather definite conclusions as to the policies most likely to yield success.

The first is that there is need for more scientific and businesslike financing and administration of highway improvement, which should start with a selection of the roads to be improved according to their relative traffic importance, and an allocation of authority to State and county authorities on the same basis. It is apparent that there is still much to be desired in this respect. Differences between the percentage of total mileage included in the State systems of neighboring States of approximately the same general culture and development, as shown by the records, are too great to be accounted for upon any reasonable basis. So also are the differences too great between the annual expenditures per mile of State system in States that have systems of approximately

the same extent and average traffic density approximately equal.

Highway building is a gigantic business. It should be conducted in a businesslike way. There is no excuse for inequitable allocation of funds or wasteful expenditure. The traffic survey furnishes a reliable means of determining such questions as the proper size of State systems, and necessary expenditures upon the several parts of the systems. It should be more generally employed as the basis of highway planning and budgeting.

We should put an end to this merry-go-round of income transfer between the States and the counties. As I have shown, the counties are rather generally the losers, and they can ill afford the loss.

We should face more frankly than we have, the question of indebtedness for highway purposes. The public loses, and loses heavily when, to avoid a State debt, the counties are thrust into debts on which they must necessarily pay a high rate of interest.

In closing I should like to add that sound highway financing implies as essential adjuncts, so evidently as to need no elaboration:

First, reasonable security of tenure for competent executive officials; second, honest and businesslike administration; third, complete and accurate accounting; and fourth, adequate maintenance of the roads in which the public capital is invested.—
American Highways.

A New Decade In Road Building

By THE EDITOR OF THE HIGHWAY MAGAZINE

An examination of highway history over a period of years reveals considerable progress and achievement, but also indicates that much work remains to be done in perfecting the nation's road system.

LAST month saw the American road builder embarked on the fourth decade of the twentieth century with a splendid record of achievement established, largely since 1910, and with every reason to anticipate a brilliant future.

It can as truthfully be said today as in 1920 or 1925 that the highway industry is still in its swaddling-clothes. The United States, with 46 per cent of the total world's road mileage, has improved but 20 per cent of its 3,000,000 miles. As a nation we are definitely committed to motorized transportation both for commerce and pleasure and the only saturation point in sight either for roadbuilding or the automotive industry seems to be the financial ability of a prosperous consuming public to pay for the motor cars and roads that have now become an established part of its economic life.

While no detailed information for 1929 is yet available, it is pretty well established that a new record was set in well-rounded highway development if not in new construction and expenditures. The magnitude of the constant developments in highway engineering during the past ten years would seem almost to belie the fact that the surface has scarcely been scratched. Comparisons are of value only as they indicate what may be expected during the next ten or twenty years, when the aviation industry will be making its greatest contribution to transportation and other mediums will be undergoing evolution.

An estimated total of \$1,315,000,000 was spent in 1929 for new construction and maintenance exclusive of city streets. This figure represents a several million dollar increase over 1928 and shows a tremendous increase over a period of years.

In 1904 the total amount expended on our roads was \$59,527,000. Ten years later this figure had risen to \$240,264,200 and in 1919 amounted to over \$389,000,000. Nineteen-twenty-one was the first "billion dollar" year. However, every year has not seen a steady increase, and expenditures since 1924 have been as follows:

1924	.....	\$1,181,521,115
1925	.....	1,288,939,707
1926	.....	1,030,287,000
1927	.....	1,069,483,000
1928	.....	1,300,000,000
1929	.....	1,315,000,000 (estimated)

One of the important trends of the past year or two has been the increasing importance of the county and other local jurisdictions in road building. The economic necessity of providing improved secondary highways is being recognized and attempts are being made to meet the problem. Some indication of the magnitude of local expenditures is afforded by a study of the following amounts devoted to local roads in 1924-29 inclusive:

		Per cent of Total Expenditure
1924	\$575,855,908	43.0
1925	639,814,606	49.0
1926	431,696,000	42.0
1927	442,706,384	41.0

1928	552,000,000	42.0
1929	405,150,000 (estimated, based on 40 states only)	30.0
Average of local expenditures (excluding 1929)		43.2

Nineteen-twenty-eight marked a high peak in construction that 1929 may not have surpassed. In the former year 29,252 miles of road was improved while a census of 42 states in the fall of 1929 showed 21,644 miles to be constructed during that year. Many individual states, however, showed considerable increases and their 1930 programs embrace continued activity of all types.

Comparisons of improvements over a period of years shows a steady development of our highway systems.

	(All figures as of year end) Total Miles in State Systems	Total Surfaced Mileage
1924	251,611	127,674
1925	270,654	145,509
1926	287,928	163,059
1927	293,353	176,566
1928	300,929 (approx.)	223,137
1929	307,000 (estimated)	.....

With the continued increase in the appalling number of highway accidents—it is estimated that 29,000 were killed on our roads in 1929—it has become apparent that the highway is, to a large extent, responsible. Hence, new construction and reconstruction has taken account of such safety factors as the radius of curves, widths of roads, bridges and culverts, crossing eliminations, guardrail protection and such minor but significant items as center-stripe painting and marking shoulders for night driving.

Extensive grade crossing elimination began about twelve years ago and since then has steadily progressed until, in 1928, nearly 1,000 crossings were eliminated in a single year's program, 703 by relocation of roads and 263 by building of overhead crossings or underpasses. In the 12-year period (1916-28) Texas had removed 440 crossings, Minnesota 321, Iowa 212 and Wisconsin 204.

Advertising Is Regulated

Exercise of the police power of the state in the regulation of roadside advertising has progressed so far that only six states are without some form of regulation. This has been a great contribution to both safety and beautification of highways.

One important factor in making motor travel easier is the adoption of uniform traffic codes and standardization of signs and markers. Beginning in 1924, a great movement for codification of the best in traffic regulations resulted in 1928 in the Hoover Uniform Vehicle Code which has been approved by many state legislatures and will eventually become a national standard.

Twenty years have witnessed a complete metamorphosis in the transportation habits of a great nation. In 1910 the railroad was the chief transportation agency. In 1930 the highway is, if not the fundamental, at least a vital factor in our transportation (Turn to Page 21.)

Teachers, Pupils, To Enter Contest on Street Safety

Highway Education Board Announces Essay and Lesson Competitions For Elementary Schools—600,000 Students And 100,000 Instructors Expected to Participate.

422 Essayists Will Receive Both Cash Awards and Medals—Writers of Three Best Lessons to be Given Checks—Prizes Donated by National Automobile Chamber of Commerce

STRESSING the need on the part of school children to set a good example in safety on the nation's highways, Thos. H. MacDonald, chairman of the Highway Education Board, Washington, D. C., and Chief of the United States Bureau of Public Roads, has announced completion of the plans for the ninth annual street and highway safety campaign for elementary school children and teachers throughout the United States. This campaign, consisting of two contests, one for children, the other for teachers, is conducted by the Board in coöperation with State, county and municipal education authorities.

The one contest, open to all elementary school pupils of the fifth, sixth, seventh and eighth grades, 14 years of age and under, is for the best essays on the subject: "What I am Doing to Set a Good Example in Safety on the Highways," while the other, open to all elementary school teachers, is for the best lessons on the subject: "Teaching the Essentials of Street and Highway Safety." The two contests are conducted simultaneously in the schools of the country.

Both state and national prizes will be awarded, and one pupil and one teacher, first national winners in their respective contests, will be brought to Washington as guests of the Highway Education Board for a week. While in Washington they also will be presented with their national prizes.

A total of \$6,500 in cash prizes and medals is offered to winning contestants, the prizes being donated by the National Automobile Chamber of Commerce. In the contest for pupils, 442 medals and the same number of cash prizes are awarded, in addition to three national prizes. In the contest for teachers there are no state prizes, but three national prizes are given. The teachers writing the best lesson on street and highway safety receives a cash prize of \$500 and a trip to Washington with all expenses paid. That teacher writing the second best lesson receives a check for \$300, while the third best lesson is awarded a prize of \$200.

Gold, silver and bronze medals are awarded to first, second and third prize winners of each state in the contest for school children, in addition to checks for \$15, \$10, and \$5 respectively. Each state has one first and one second prize winner, while the number of third prizes depends upon the number of elementary school children enrolled. Thus, Nevada and several other states, where the number of elementary school children is comparatively small, are awarded but one third prize, while Pennsylvania is allotted 23 and New York 25.

Following the selection of the best papers from each of the 54 states and territories, the essays and the lessons are entered in competition for the national prizes. These papers are passed upon by a committee of three judges generally representing the field of education, literature and business. First prize winner in the national contest for pupils in addition to being brought to Washington as the

guest of the Board, is presented with a gold watch while in the National Capital. Second and third prize winners in the essay contest receive gold watches.

The date on which essays and lessons must be handed to the school principal is May 9. Essays must be not more than 500 words in length and each contestant is required to submit an illustration, either original or clipped from a magazine or newspaper, that is pertinent to the question of safety education. A selection from these illustrations will be used by the Board in preparing a safety poster for the contest in 1931. Safety lessons must be between 1,000 and 3,000 words and may take the form which the teacher thinks best presents the subject, such as a lecture, recitation, game or drama.

These contests have been conducted by the Highway Education Board during the past nine years and each year has seen an increase in the number of participants. Last year the number taking part



Project No. 17, Manatee County.

totalled almost 600,000 pupils and 100,000 teachers, and this year an even greater number is expected to enter.

The best papers for each state are selected by a state committee, as a rule named by the State Superintendent of Public Instruction. After the selec-

tion of the prize winning essays from each state or territory, these papers, with the best lessons, are forwarded to Washington where those entered in the national contests are typed and numbered and submitted to the national judges without any indication as to authorship.

\$13,500,000 Highway Improvements Completed Last year in Florida

By **ROBERT W. BENTLEY**, Chairman, State Road Department, Tallahassee

THE budget of the Department for 1929 called for an outlay of, in round numbers, \$13,500 000.

Our operations to October 31, 1929, show a total of 267 miles of roads hard-surfaced; and additional 102 miles resurfaced; 205 miles of new grade built; 4,320 feet of new bridge construction, most of these bridges being of concrete.

Contracts let for new work during the period embrace 216.26 miles of hard-surfacing, 32 miles of sand-clay, 68 miles of grading, 7,143 feet of concrete bridges and 75 feet of timber bridges. In addition, state convict forces are engaged in hard-surfacing, with three projects underway totaling 35.03 miles.

The State is building chiefly concrete roads on the main arteries, and rock-base, surface-treated roads for lighter traffic.

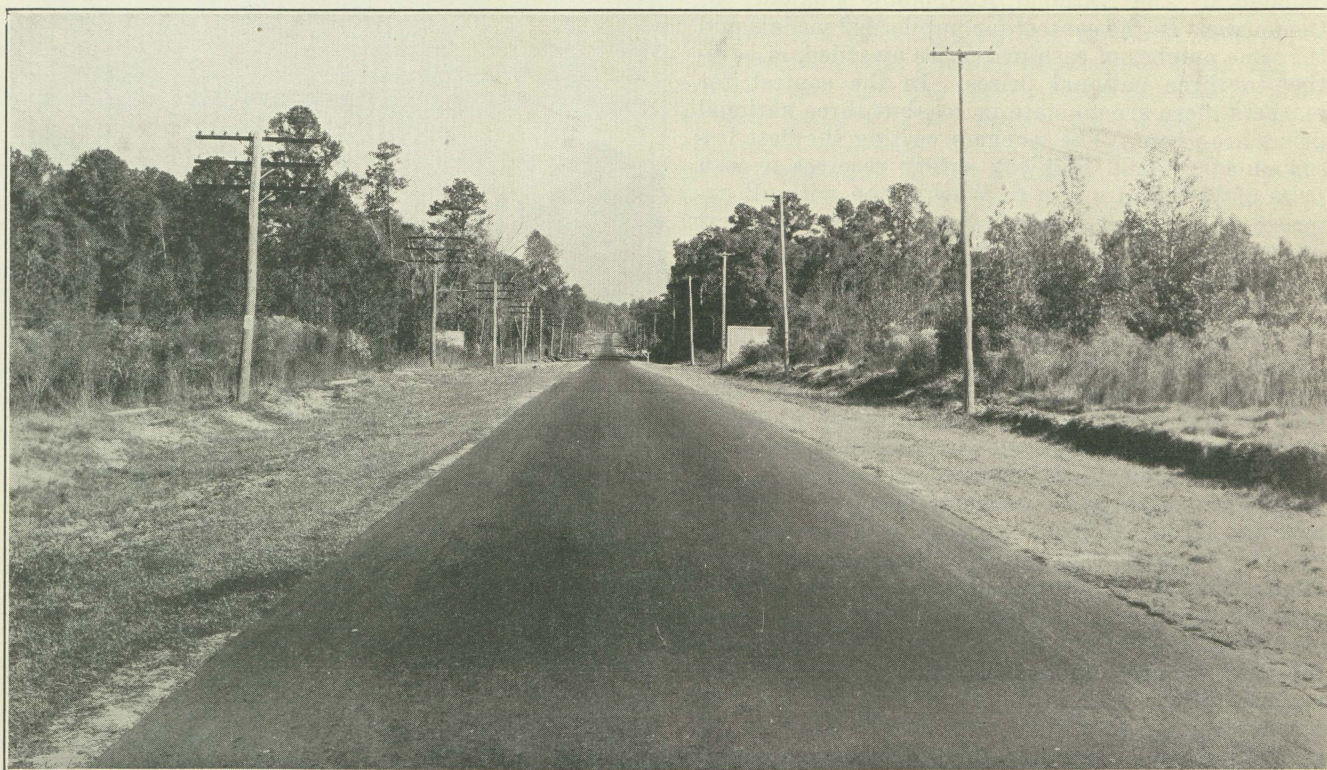
At this time the Road Department is building nearly a score of concrete bridge structures. Two of

these—the Caloosahatchee River crossing on the Tamiami Trail and the Peace River crossing on the same highway—are each a little more than a mile long.

The State this year completed two great bridges, one at East Bay, the other at West Bay, both on Road 10, Bay County. The East Bay bridge cost \$820,084.29. West Bay bridge is 7,530 feet long and cost \$1,205,951.78.

The State now has under maintenance 3,379.43 miles of roadway, in the state system.

The program for 1930, budget for which will be set up in January, calls for about the same amount of construction as in 1929. A new requirement instituted this year is that all new right-of-way shall be 100 feet wide, as against the former requirement of 66 feet.—Manufacturers Record.



Project 545. Road 5. Hernando County. Sheet Asphalt.

Road Department Cuts Expenses

The Chairman of the State Road Department has recently addressed a letter to the Governor in which the savings effected by the Department during 1929 are set out. The Chairman's letter is as follows:

STATE ROAD DEPARTMENT OF FLORIDA

Tallahassee, January 27, 1930.

Hon. Doyle E. Carlton,
The Governor,
Tallahassee, Florida.

My dear Governor:

I wish to submit a brief report on the work of the State Road Department for 1929, with some contrasts with its operations during 1928.

Payrolls for 1929 totaled \$1,755,614.24, and for 1928, \$2,125,513.77—a reduction of \$369,899.53 last year.

Cost of maintenance per mile of road was cut \$234.37, from \$523.48 in 1928 to \$289.11 in 1929. There was spent on maintaining 2,795.58 miles in 1928 the sum of \$1,463,439.32, while 3,332.97 miles in 1929 were maintained at an outlay of \$963,621.71. This was accomplished in part by a proper reduction in forces, and in part by the use of machinery in place of hand labor. The condition of the roads speaks for the wisdom of the change.

The accompanying tables speak for themselves. You will note that the Department completed 315 miles of hard-surfaced roads in 1929, as against 202 miles in 1928; and in the low types, added, in addition to the above-mentioned 315 miles, 16.33 miles of surface-treated sand-clay roads as against 10 miles of this type in 1928; and 86.81 miles of sand-clay roads as against 5 miles in 1928.

The Department devoted more energy to surfacing than to building new grades in 1929, yet at the close of this year had of grades ready for surfacing 572 miles. In 1929, 241.93 miles of grades were built as against 295 miles in 1928. During 1930 we will build less of

new grades than in 1929, so as to catch up as far as possible with hard-surfacing of grades already standing up.

In bridge-building the Department completed only 3,501 feet of concrete and 195 feet of wooden construction during 1929, as against 13,003 feet of concrete and 2,789 of wood in 1928, but during the year let contracts for 7,144.31 feet of concrete and 75 feet of wooden bridges, as against 5,260 feet of concrete and 1,569 of wooden structures put under contract in 1928. We are now building more than a score of concrete structures.

The Department's total disbursements in 1929 totaled \$10,967,163, as against \$14,342,548.90 in 1928.

You will be interested to know that on January 1, 1930, we had in cash on hand \$683,083.58, as against \$108,243.95 on January 1, 1929.

Naturally, the loss of one cent per gallon of our revenue from gasoline the latter half of 1929, and the absorption into the general revenue fund of the gasoline inspection tax, title certificate fund, and borrowings from our funds to aid in carrying on the necessary expenses of the general revenue fund, had its effect on our program of work. The total of these losses of revenue which we underwent was \$640,000, made up as follows:

5% Fund	\$100,000
Gasoline tax fund.....	165,000
Title certificate fund.....	100,000
Gas inspection fund.....	275,000
Total	\$640,000

Sincerely yours,

ROBERT W. BENTLEY, Chairman.

Gasoline Taxes Theory, Practice and Hazards

By EDMUND P. LEARNED, Graduate School of Business Administration, George F. Baker Foundation, Harvard University, Boston, Mass.

As instructor of economics and commerce in the University of Kansas, Edmund P. Learned made a careful investigation of gasoline taxes which was published as a university bulletin in 1925. He has been a close student of the subject for more than a decade.

All States now impose a tax on gasoline. In 1929 the total amount of this tax after deducting the cost of collection was \$415,837,000. Of this amount about \$229,765,000 was spent on state highways and \$21,034,000 was employed for payments on bonds issued largely for state highway construction. Another portion of \$74,564,000 was expended on county and township roads. A final \$20,474,000 was spent for miscellaneous purposes, 60 per cent going for the improvement of city streets and 40 per cent for other purposes than highway improvement. During the year 21 states increased their gasoline tax rates 1c. or 2c. a gallon and two states formerly without gasoline taxes created them. The problems in rates, distribution and diversion which these figures indicate and the hazards which wrong solutions portend to road building are considered in the following article, which discusses tax rate limitations, tax distribution and diversion, and the reaction of business interests and the public toward recent legislation. In conclusion a sharp warning is sounded against the abuse of gasoline taxation.

WITHIN a period of ten years the gasoline tax has spread from Oregon, where it was first adopted, to every state in the Union. It is no longer experimental but is a standard device for raising revenue. The Oregon law became effective Feb. 25, 1919. North Dakota, New Mexico and Colorado soon enacted gasoline tax laws. At the beginning of the year 1921 five states had gasoline tax laws, all levying, with a single exception, 1c a gallon. During 1921 eleven states were added to the roll of those using the tax. The year 1923 established a record for new enactments, with sixteen new laws. Increases in the rate of tax were common in 1923, though at that time 3c per gallon tax was considered high. By the end of 1925 New York, Illinois, New Jersey and Massachusetts were the only states without gasoline tax laws. One state had a 5c tax, four states had a 4c tax, thirteen had a 3c tax and 24 had rates of 2c or less. In 1929, however, with all states attempting to keep gasoline tax statutes on their books, the most popular rate is 4c a gallon; 30 states have a rate of 4c a gallon or more. Three states have rates of as much as 6c a gallon.

A new tax which can sweep the country in a period of but nine years is truly a remarkable tax. Surely this form of tax must have unique economic or political attractions.

Theoretical Basis

The major purpose of gasoline taxes has been to raise funds for good roads. The motor-vehicle era required better roads than the horse-and-buggy age. Benefit districts, motor vehicle license fees and gasoline taxes—all of these have had their place as sources of revenue for road building. The most potent argument for a gasoline tax has been that it measures the use of the road more accurately than any other tax on motor vehicles or than any other type of tax.

The benefit district had its place and still has its place as a source of funds for road building. It was used extensively in the early development of good roads in this country. Some of the benefit of good roads undoubtedly accrues to those by whose property they pass. That some cost of roads should be borne by abutting property and the benefit district is admitted. Yet few would insist that all the cost of the road should be borne by those whose property it touches. Cars from cities use primary roads more than cars from country districts. For primary roads, at least, a large proportion of the cost of construction and maintenance of roads should be borne by those who use them. The share of the cost of the road which the abutting property should pay depends to a large extent upon the type of road concerned, primary, secondary or tertiary, and its location with respect to flow of traffic.

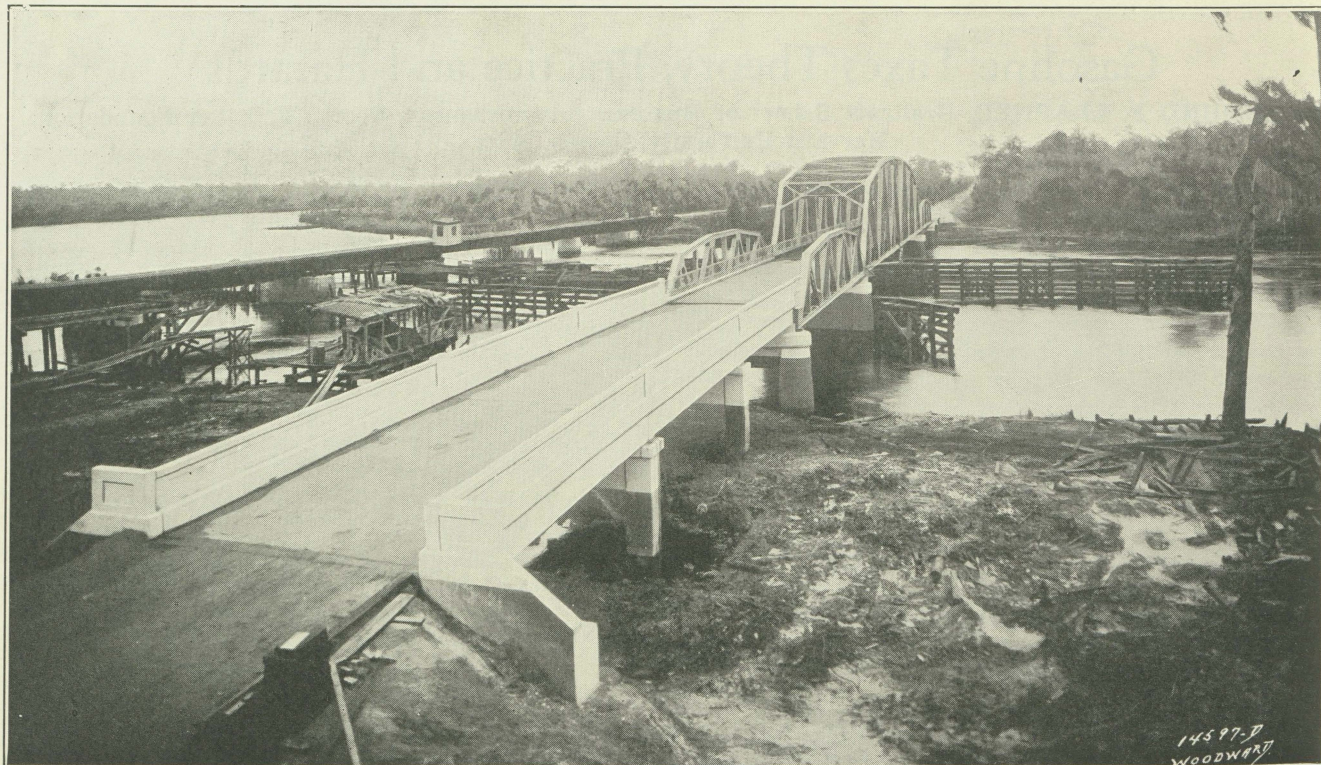
License fees on automobiles and trucks have been another means of raising funds to pay for better roads. These fees have their place, both as sources of revenue and as devices for the regulation of those who drive upon the road. Nevertheless, to increase license fees to an amount sufficient to pay the costs of road

construction and maintenance is likely to lead to inequitable results as compared with the manner in which the gasoline tax operates. High license fees become an unfair burden on those who use their cars little, and become relatively light on those who use their motor vehicles a great deal. The gasoline tax, on the other hand, works out as would a system of toll roads: the user contributes toward the cost of the road only when he uses it.

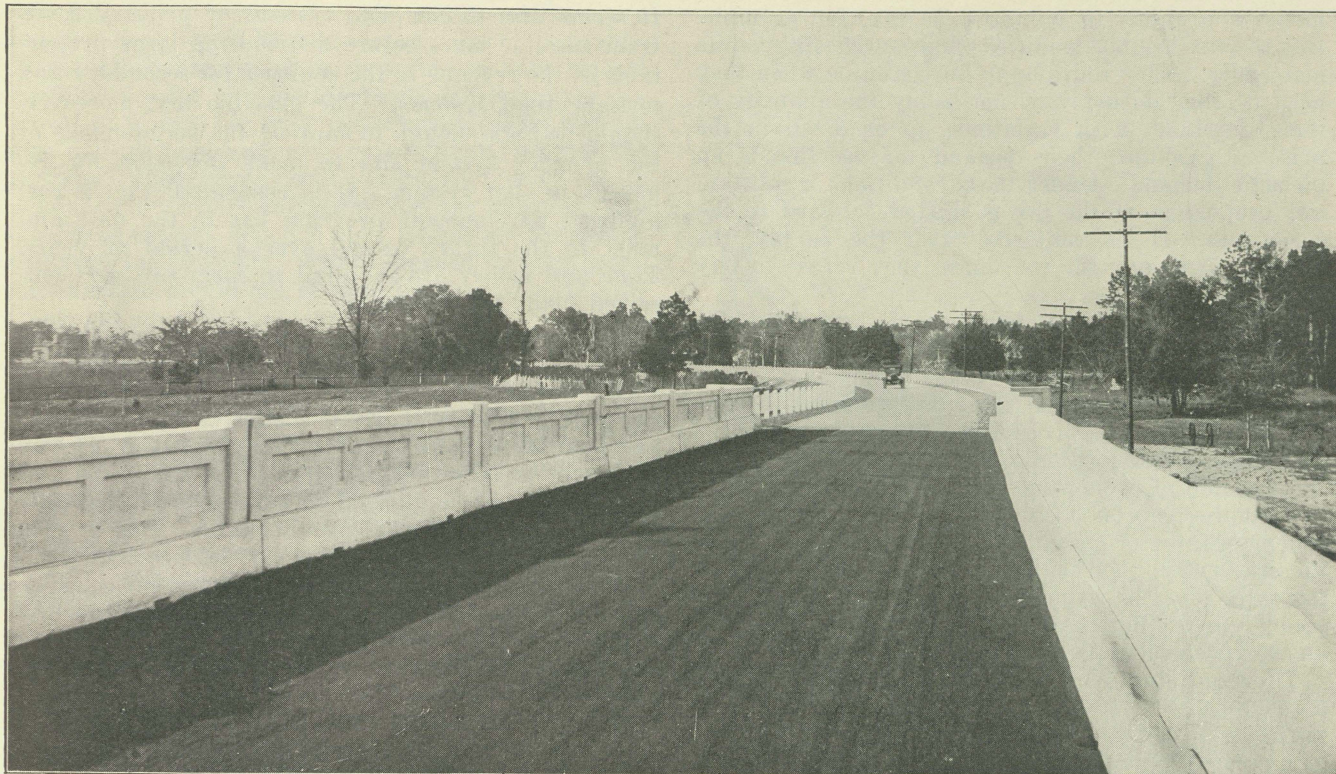
As was suggested above, the tax on gasoline measures with some accuracy the wear and tear of the automobile on the road. The amount of gasoline consumed in a motor vehicle bears a direct relationship to both the distance traveled and the weight of the vehicle, the two factors that have a direct relationship to the wear and tear on the road. This argument in favor of gasoline taxes is well recognized and needs no further development.

The fact that the gasoline tax extends the benefit principle of taxation to users of roads who are not also abutting property owners makes it a virtually inevitable recourse to those states committed to the toll principle of road revenue.

It is desirable to note two other bases for supporting gasoline taxation. The first is predicated upon the ability principle of taxation in contrast to the benefit principle exemplified in the foregoing argument. It may be argued that an automobile is a luxury commodity, the ownership of which indicates material well-being and ability to share in the financial burdens of government. This argument has some merit; yet essentially it is little more than a weak attempt to substitute a gasoline tax for the income tax, which, carried to its logical conclusion, the ability principle requires. Indeed, the occasional attempt to generalize the application of revenue from the gasoline tax emphasizes this danger.



Project 421. St. Mary's River Bridge. Road 3.



Looking West from Suwannee River Bridge—Road No. 1.

The place of the gasoline tax as a source of general revenue in any system of taxation depends necessarily upon characteristics of the tax system as a whole. It is an axiom in public finance that a tax which may seem unjust in some particular when viewed as an individual tax may still be found to be eminently just when viewed as part of a whole system of taxation. It is therefore impossible to make a general assertion about a gasoline tax as a source of revenue for general revenue purposes and to have the assertion wholly correct under all conceivable circumstances. Notwithstanding, the writer believes that the gasoline tax should be restricted to raising funds for use upon road construction and maintenance and not as a source of general revenue. The tax structure of many states, moreover, supports this view rather than the view that the tax should be used as a source of general revenue.

The remaining basis for gasoline taxation is one of economic policy with respect to natural resources. A very high tax on gasoline and other petroleum products—much higher than any tax now in effect—could be used to discourage the purchase and sale of gasoline and thus to encourage the conservation of valuable natural resources. Needless to say, the oil industry would oppose such measures to the highest court and would endeavor to keep public sentiment from indorsing such a policy. It is unlikely that this doctrine will have any influence on gasoline taxation programs during the immediate future.

Tax Rate Limitations

Regardless of the theoretical bases on which gasoline taxes can be justified, there is no question that in effect they are sales taxes. As a sales tax the gasoline tax has the advantage of convenience of payment. The consumer of gasoline pays the tax when he buys gasoline. Only a small amount for taxes is involved at each purchase. As in indirect taxes, the real burden of the tax tends to be concealed in the price of

the product. Yet the burden of the tax is present, and must, if the rate be continually raised, become perceptible and eventually onerous to the motorist. It must be remembered that the existence of the tax is due only to the approbation of its payers.

This latter point involves a brief examination of why the consumer has found the gasoline tax practically a burdenless tax. Automobile owners know that the first cost of a car is not the largest cost. When the buyer of gasoline can see the operating costs for his car reduced as a result of the manner in which his contribution to gasoline taxation revenue has been spent, he is willing to support the tax. What he pays out of one pocket in gasoline taxes he avoids paying out of the other pocket in repair bills, depreciation allowances and general maintenance expense. This line of thought explains partly why the advancing rates of taxation for each gallon of gasoline have not caused unfavorable consumer reactions. Under a 5c tax the consumer may not have any more expense for operating a car than he formerly had when roads were less satisfactory.

Although this argument is frequently advanced, it seems to the writer to be more nearly a rationalization than an interpretation of the public action. More important is the psychological satisfaction which users secure from the extension of good roads—a satisfaction so highly esteemed that they are willing to pay for it.

Though the consumer has not yet objected to gasoline taxes, it does not follow that there is no upper limit to gasoline tax rates. How high the tax rate will go is difficult to forecast. Rates will probably advance to the point where the majority of the community decides that the further luxury of good roads is no longer worth the extra cost represented by a higher gasoline tax rate. Though the gasoline tax has been a burdenless tax to many people, there are

many who object to paying a 5c tax, for example. But the tax has not modified their purchasing habits materially. They continue to buy gasoline when they need it; they do not vary noticeably the quantity of their purchases with variations up or down in the price of gasoline; their demand for gasoline is an inelastic demand. Under these conditions a substantial proportion of the tax is shifted forward to the consumers. If the majority favor the 5c tax, the minority help pay the tax unless they refuse to buy gasoline.

It is pertinent to ask, however, if there would be as many 5c and 6c gasoline tax rates if the price of gasoline were 30c a gallon without the tax. Under those conditions the final price of gasoline to buyers would be from 50 per cent to 100 per cent higher than it is in some portions of the United States today. The demand of users would still be relatively inelastic even at the price of 30c to 36c a gallon. Public sentiment in favor of gasoline taxes, however, could turn the other way. Through political channels, gasoline tax rates could be reduced. Just now this possibility seems remote—but the recent stock market crash was an unexpected happening to many people.

The question of stability in the gasoline tax rate as a source of revenue for road purposes is really important. A low tax rate is less likely to be reduced as a result of changes in the price of gasoline than a high one. Where there is stability in the revenue, bonds as a method of financing are more sound than they are where there is lack of stability. In laying out the financial program for highways in a given state it would seem desirable to give some attention to long-time prospects for stability in the gasoline tax rates. Nor is it advisable for legislators to expect that gasoline will always be as low in price as it has been in the past few years.

Unless the state decides as a matter of public policy to tax the oil industry heavily in order to force it to curtail operations, the writer is inclined to believe that the rates for taxation of gasoline should not be raised further. Four years ago, when the 2c and 1c rates were most common, he predicted that the most common gasoline tax rate would be 3c or perhaps 4c a gallon.* Today the 4c rate has more adherents than any other rate. It is not unreasonable to believe that a 5c tax will prove to be the most common. The question of the rate in individual states, however, must depend upon the will of the people. If roads are few, the population may be prepared to pay high taxes in order to secure the desired transportation facilities. If the road system is well developed, a lower tax may care for adequate maintenance and renewals.

Closely related to the public sentiment in favor of gasoline taxes and a political factor in the question of high tax rates is the problem of the use of gasoline tax revenues. On this question no categorical answer can be given. The conditions within a given state are bound to modify any general rules enunciated. Yet the higher the gasoline tax rate the more likely is diversion.

Tax Diversion and Distribution

When the tax rates were much lower than they are today and primary systems of roads were not well developed, the major share of the revenue was properly spent by many states on state highway systems.

*E. P. Learned, *State Gasoline Taxes*, Humanistic Studies, Vol. III, No. 4, University of Kansas, Lawrence, p. 24.

It seems wise to complete systems of primary roads from gasoline taxes before distributing large proportions of the revenue to the counties for secondary and tertiary road systems. The gasoline tax, moreover, should be high enough to support the maintenance of the primary system and to make provision for renewals in that system. It is recognized that a real highway development program has in the past and must in the future extend over a period of years. Time and money are required to carry out well-conceived plans for highways.

The argument for county and city participation in revenue from state gasoline taxes is a strong one. If a gasoline tax is an equitable method for measuring the benefit of state roads, it should be equally equitable as a measure of the use of county roads. If this argument be admitted, it follows that the towns and counties should be allowed to raise money for roads and streets by means of gasoline taxes. But to give these political units the power or right to levy such taxes might involve constitutional questions. More important, however, is the confusion which would exist when within a state there are sundry gasoline tax laws. Attempts at consumer evasion would be common. Oil companies, moreover, would have to incur extra accounting expense. When a state has a high rate of gasoline taxation, it seems more logical for the state to share a portion of its gasoline tax revenues with its political subdivisions.

A number of different methods may be followed for distribution of a share of state gasoline tax funds. One method is to return to the local government divisions amounts in proportion to the amounts collected in the county. This method is an easy one to administer and it insures that those who pay the tax within the district will have some of it returned to their district. Another method is to use the population within a district as a basis of distribution. Where the population is dense, there are usually more roads to be maintained. Some states use the number of registered motor vehicles in each county as a basis of distribution. Road mileage bases are used in other cases. An equal disbursement to each county is hardly a satisfactory arrangement, though some times it is politically all that can be accomplished. Theoretically, a combination on the basis of area, registration of motor vehicles and mileage of improved roads for the local government division is commendable. It places a great deal of weight on the requirements for maintenance. Yet in the area factor the large county, oftentimes not wealthy but with a vast system of roads to maintain and build, is protected. In practice, some more simple formula often accomplishes the same equitable result. The more simple the method the better it is. A final answer on the method of distribution cannot be given. The conditions within a state must govern the policy of the state.

But more important than the method of distribution to the local subdivision is the manner in which the money is spent. Here engineers in their professional capacity have an opportunity to see that the people get value received. Likewise they must use their influence as members of the body politic to see that the money is not distributed in such small dribblets that it is used ineffectively. Distribution of gasoline tax funds to a political unit such as a township (to be spent under the supervision of the overseers of the township) does not seem commendable. The county

unit with the supervision of the county engineer on maintenance expenditures seems more desirable. Oftentimes, moreover, it is desirable to have capital expenditures for new county roads subject to the approval of a state highway department. This will insure non-political and wise expenditure, because the highway department will ordinarily have more capable and efficient engineers than the counties. The success of the tax depends very largely on the distribution of the proceeds. Funds secured through gasoline taxation should not be used for general state purposes, but only for road purposes.

Attitude of Oil Producers

This survey of gasoline taxes would not be complete without a consideration of the point of view of oil companies whose product is subject to the sales tax. They are naturally the chief opponents of the tax. It is desirable to review their position to determine whether the previous conclusions developed from the user's point of view require modification.

The real objection of oil companies to gasoline taxation centers about two things. First, the industry fears unfair taxation. Almost any tax would be opposed by the industry on the general principle that if the tax were successful it would prove to be the entering wedge for further taxes on the industry. The second objection has to do with the rate of taxation. Some writers in oil journals, for example, maintain that the recent depression in the oil industry was partly caused by the heavy burden of gasoline taxes on the industry. The burden of the argument of some in the industry is as follows: During the past few years an ever-increasing supply of oil and gasoline has been produced and thrown upon the market. Oil men in their anxiety to move stocks have depressed prices to a point where there is no room for both the tax and profit, and since the tax must be paid profits have suffered. Under these conditions the demand for gasoline has more to do with fixing the price than the forces of supply. The writer asserts that, had there been no tax on gasoline last year, a considerable portion of the \$250,000,000 paid to the states in the form of these taxes would have been spent for gasoline and the industry would have been better off.

The argument of those in the oil industry cannot be granted without question. The social income being limited as it is, it is true that if \$250,000,000 is paid in gasoline taxes it cannot be used to buy gasoline. But it does not follow that gasoline would have been purchased with that amount of money had no gasoline taxes been levied. As was pointed out earlier, the demand for gasoline is relatively inelastic. The people who drive cars will use about the same amount of gasoline from year to year regardless of the price, if the price does not fluctuate within too wide range. By paying gasoline taxes they may have had a few less pennies for the theater or for books, but they have continued to buy as much gasoline as if there had been no tax. As a matter of fact, it is not improbable that the increased consumption of gasoline per car during recent years has been encouraged by the good roads created by the gasoline tax.

The real difficulty of the oil industry does not lie in the gasoline tax, but in the failure of the industry to keep production in line with demand at profitable levels. Indeed, the oil industry has been fortunate in recent years in having an expansible market. Whereas, the demands of individual customers have



Project 534—Road 24—Brevard County.

been inelastic and therefore would not have taken the great increases in supply at even present price levels, the oil companies have gained the present levels from the fact that the number of cars and trucks in use and on the road has been increasing year by year. This increase in the breadth of the market has enabled the oil companies to secure better prices for increased supplies than they would have received had it not existed.

Though it does not seem that the oil industry has been seriously harmed by gasoline taxes as yet, still higher rates, if high enough to curtail demand substantially, might well reduce volume which could not be entirely offset by higher profit margins, in which case, of course, the aggregate profits of the industry would suffer substantially. The industry already has widely fluctuating profit margins on account of the manner in which tremendous supplies of oil suddenly appear in the market and have to be liquidated at less than a normal cost of production. Even though the industry's version of its trouble is not accepted, still it seems that marked upward revisions in gasoline tax rates might modify the situation so that the oil companies would find conditions somewhat more disconcerting than they now are.

Warnings for the Future

What then can be said about the future of gasoline taxes, whether judged from the point of view of producers or consumers of gasoline?

(Turn to Page 21.)

Work of State Road Department

INFORMATION coming out of Tallahassee is to the effect that in 1929 there was a reduction in payroll expenditures by the State Road Department amounting to about \$370,000 from the previous year's costs, and a cut of \$234.37 a mile in the expense of maintaining roads. The report submitted to Governor Carlton recently, shows that the total payroll for 1929 was \$1,755,614.24. The payroll for 1928 amounted to \$2,125,513.77. The reduction is claimed as a result of economical administration and should be appreciated by the people of the state. Labor-saving machinery has been added to the equipment of the road department, and this, effectively employed, has resulted in greater mileage of construction and allowed full and proper attention to completed roads at somewhat less cost to the taxpayers.

Facts and figures regarding the accomplishment of the past year in the road department are always interesting. Chairman Bentley's statement showed that in the matter of new construction, during the twelve-month, 315.41 miles of roads were hard-surfaced; this was compared with 202 miles in 1928. Besides this excellent advance indicated, a total of sixteen miles of surface-treated sand-clay roads was completed; the report for 1928 showing ten miles of such work. Sand-clay roads extending 86.81 miles were constructed in 1929, while only five miles of such road was finished in the previous year. New grades built totaling 241.93 miles, were reported. The chairman stated that this mileage of surfacing brought the totals up to 418.55 miles for 1929 and 217 miles for 1928.

Materials and methods being used in road construction appear, from the report, to be plain cement concrete, bituminous concrete, asphalt block, surface treated rock base, sheet asphalt, etc. The road de-

partment is doing its work well and profiting by experience of former years is making permanent roads where at first only experimental surfacing was possible. Florida's roads are steadily improving, and the state will have a fine system of splendid highways within a reasonable time. There can scarcely be any doubt regarding the necessity and wisdom of continuing the work as rapidly as is possible in consideration of permanency.

Among the several matters that have been demanding attention of the road department the cost of repairs after storms and floods in some sections of the state appears in the considerable item of \$393,393.89; but it is also shown that this is nearly \$40,000 less than was necessarily used in this way in 1928. New contracts entered into during 1929 were listed totaling \$5,519,405.45. This is a large amount of money; but the contracts of 1928 called for the expenditure of more than seven million dollars. Contracts completed in 1929 cost the state \$7,158,451.06; in 1928 the state paid out, on completed contracts, \$10,893,997.75.

Building bridges, a highly important feature of road work, occupied much attention and cost a lot of money. During 1928, 13,003 feet of concrete bridges were constructed, and last year the road department built 3,501 feet of concrete bridges and 2,789 feet of wooden bridges. From the records it was shown that the mileage of roads under maintenance in 1928 was 2,795.58, and the amount spent to keep them in condition \$1,463,439.39. Last year the mileage maintained was 3,332.97 miles, which cost the state through expenditure of the road department, \$963,621.71. The showing made throughout appears to be satisfactory.—Florida Times-Union.

Senate Passes Highway Bill

An Amendment Sends Measure Back For House Conference

By JAMES W. BROOKS, Director, American Highway Educational Bureau, Washington, D. C.

THE SENATE has passed the Dowell-Phipps Bill which increases Federal Aid for highways from \$75,000,000 to \$125,000,000 a year for the next three years. An amendment was added to the measure providing for an increase in the limitation of Federal Aid from \$15,000, exclusive of bridges, to \$25,000 per mile. The measure has therefore gone back to the House for conference.

When this measure, which has been sponsored by the American Association of State Highway Officials, reaches President Hoover for his signature, the machinery for greatly expanded road building programs will be actually set in motion by state highway departments. The opening of the 1930 construction season is near at hand and highway officials under public pressure for greater speed in road building are anxious to avoid all unnecessary delay in letting contracts.

In this connection, it will be of interest to motorists and other taxpayers to know that along with increased Federal Aid, the standards of efficiency in road construction have increased and that notwithstanding the demand for more roads, engineers are taking due caution to avoid being rushed into

the building of weak roads where traffic demands safety and strength under passing tonnage. More and more as road building progresses, the policy of building for today in the vain hope that tomorrow will take care of itself is falling into disuse.

One other hopeful sign in highway progress is the tendency in highway administrative circles to place a check upon legislative road building. That is to say, the tendency of state assemblies at the behest of some of their members to increase road mileage for political reasons, or in plain terms, to get votes. A road legislated to a place on a map is not a road, in the modern sense, until the engineer can build it, and it is not a mere coincidence that construction funds must be provided. Too, often, however, this cold fact is overlooked.

Not until the past year or two have earnest efforts been made to reduce rather than extend highway mileage, particularly in the matter of purely local roads. As a long step toward economy in this direction, the U. S. Bureau of Public Roads through its chief, Thomas H. MacDonald, is suggesting that "we can release a large amount of land that is now

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A NEW DECADE IN ROAD BUILDING

(Continued from Page 12.)

scheme. Meanwhile, the railroad has adapted itself to highway transportation. Seventy-two steam roads employ 2,100 motor buses as supplementary to or independent of their regular lines. Seventy lines own separate motor trucks for line and terminal service and store delivery. Twelve rail systems own fleets of 50 or more buses and one large western road operates 275.

Highway construction methods and practices have been greatly improved during the past year. One of the most valuable contributions of the year has been the further development of economical and easily applied materials for surface-treating secondary roads. It has become well recognized that the unification of the United States by highways depends not so much upon the construction of a few thousand miles of through interurban roads as upon the development of a complete network of roads built for farm to market, rural mail and school bus traffic, and it is in this development that cheap and effective surfacing has its role.

Isolation Is Disappearing

Nineteen-twenty-nine was notable in yet another respect, namely: in the extension of highways to remote and isolated regions such as the mountains of eastern Kentucky and the mountains and barren lands of northwestern Arizona.

Notable as has been the progress which is making the United States the world's greatest "good roads" nation, it is only a first step in the programs that 1930 and ensuing years will see carried out. This year's plans are more ambitious and comprehensive than ever before, particularly in the South, where thirteen states plan total expenditures of \$222,250,000 for construction and maintenance of state roads, exclusive of county activities. Extensive bond issues are anticipated in Mississippi, Maryland, Iowa, Alabama and Georgia, ranging in at least one case up to \$100,000,000 in amount. Eastern states are engaged largely in improving and amplifying existing roads, although Pennsylvania, New York and Ohio added 500, 700 and 300 miles respectively in 1929 and plan further construction this year. Other states will continue the programs of 1929 which, in the central and far west, consist of extensive grade and drain projects.

—The Highway Magazine.

GASOLINE TAXES THEORY, PRACTICE AND HAZARDS

(Continued from Page 19.)

The gasoline tax is patently here to stay. It has been an effective and a relatively painless means of raising revenue. The fact that it is a sales tax on a commodity of inelastic demand makes it seem likely that the tax can be a fixture in our state revenue machinery. But there are always sleeping political dogs. Unreasonable rates and dissipated expenditures will wake these dogs sooner than anything else.—Engineering News-Record.

Installation of "through traffic stop" signs in Philadelphia as a safeguard against accidents at street intersection has been recommended by the Keystone Automobile Club.

SENATE PASSES HIGHWAY BILL

(Continued from Page 20.)

legally laid out as public highways and perhaps fenced off, but which is not in fact used except to reach the farm fields. I do not mean," Mr. MacDonald continued, "the roads which serve the agricultural population. I believe we can exclude a very considerable mileage of the total of 3,000,000 miles from our public roads if we have adequately planned systems."

Mr. MacDonald went on to say, "The whole keynote of the economical expenditure of highway funds is planning systems that, with the least possible mileage, will reach the largest number of people. It means not only planning properly, as I feel we have planned in the system of Federal-aid roads, but auxiliary systems of roads within the metropolitan districts to serve the local traffic need there; and then consolidating into systems the roads of the rural districts, and discarding as public responsibility those which are only lanes used to reach the field. I think we can throw back for agricultural production a considerable acreage of land, and at the same time can get from under the responsibility of a considerable mileage of so-called roads."

"Every speech," says a K. C., with special reference to after-dinner oratory, "should have a beginning, a middle and an end." We ourselves are not convinced that the beginning and the middle are indispensable.—Punch (London).

Denial of Privileges

Judge—"You are charged with running your car 60 miles an hour, smashing a telegraph pole, going through a plate glass window, and injuring six people. What do you say?"

Young Lass—"Don't the \$15.00 I pay for my license entitle me to any privileges?"—Wabash Cavemen.

"Don't you know that you should always give half the road to a woman driver?" asked a policeman of a motorist who narrowly avoided a collision.

"I always do," he replied, "as soon as I find out which half of the road she wants."—Motor Life.

"It's not the cost of the car that worries the average motorists . . . but the upkeep."

"Yes, and sometimes the turnover."—Reel Dope.

Wasey—"So you and your wife share alike in the work of getting breakfast?"

Kudner—"Yeah. She burns the toast and I scrape it."—The Pathfinder.

Where Bunk Springs Eternal.

"You have been coming to Washington for many years."

"Yes," answered Senator Sorghum.

"Have your impressions of this great city changed?"

"In certain respects. It has bigger and more beautiful buildings, but pretty much the same old line of talk."—Washington Star.

Status of Construction

THROUGH NOVEMBER 30th, 1929

Proj. No.	Contractor	Road No.	County	Total Length Miles	Clearing Miles	Grading Miles	Base Miles	Surface Miles	Type	Per cent Complete
52	Robert G. Lassiter & Co.	1	Escambia	10.09	.....	.....	.....	10.09	Concrete	100.00
62-A	L. B. McLeod Const. Co.	24	Osceola	1.10	.....	.....	0.00	0.00	S.T.R.B.	0.00
62-C	L. B. McLeod Const. Co.	24	Osceola	12.09	.....	.....	0.00	0.00	S.T.R.B.	0.00
63-A	Morgan-Hill Paving Co.	4	Palm Beach	9.21	.....	.....	.....	0.00	Concrete	0.00
64-A	H. E. Wolfe Const. Co., Inc.	17	Hillsborough	9.61	.....	.....	.....	.48	Concrete	7.70
64-C	H. E. Wolfe Const. Co., Inc.	17	Hillsborough	9.61	.....	.....	.....	6.34	Concrete	58.00
518	Broadbent Const. Co.	5-A	Lafayette	17.57	.....	.....	17.57	0.00	S.T.R.B.	76.00
587	Duval Engr. & Contr. Co.	5-A	Columbia	4.43	.....	.....	4.43	4.43	S.T.R.B.	100.00
644-C	L. B. McLeod Const. Co.	10	Wakulla	5.05	.....	.....	5.05	0.00	S.T.R.B.	70.00
669-Y	Wm. P. McDonald Const. Co.	27	Collier	3.00	.....	.....	3.00	3.00	S.T.R.B.	100.00
669-Y	State Convict Forces	27	Collier	10.55	.....	.....	0.00	0.00	S.T.R.B.	0.00
695	Manly Const. Co.	2	Lake	6.18	.....	.....	6.18	1.24	S.T.R.B.	79.00
706-A	Manly Const. Co.	28	Clay	1.14	.....	.....	1.14	1.14	S.T.R.B.	100.00
706-A	T. B. Gillespie, Inc.	28	Clay-Putnam	10.83	.....	.....	0.00	0.00	S.T.R.B.	0.00
707	Leon County Forces	43	Leon	5.31	5.31	5.00	.....	.....	Graded	97.00
715	L. M. Gray	28	Union	5.27	.....	.....	5.27	1.05	S.T.R.B.	82.15
716	Duval Engr. & Contr. Co.	28	Bradford	11.21	.....	.....	11.21	2.24	S.T.R.B.	81.95
717	Manly Const. Co.	28	Bradford	10.93	.....	.....	10.93	7.72	S.T.R.B.	90.00
718	Duval Engr. & Contr. Co.	5-A	Columbia	8.22	.....	.....	8.22	8.22	S.T.R.B.	100.00
726	State Convict Forces	19	Dixie	12.59	.....	.....	12.59	.63	S.T.R.B.	85.00
728	Robert G. Lassiter & Co.	10	Leon	11.76	.....	.....	.....	8.16	Concrete	70.00
735	W. J. Bryson Paving Co.	40	Walton	13.72	13.72	13.72	.....	13.72	Sand Clay	100.00
742	L. B. McLeod Const. Co.	13	Alachua	7.65	.....	.....	7.65	.38	S.T.R.B.	75.00
749	L. B. McLeod Const. Co.	14	Gilchrist	7.81	.....	.....	7.81	7.50	S.T.R.B.	98.00
750	State Convict Forces	14	Gilchrist	12.97	12.97	12.32	.....	.....	Graded	96.36
750	L. B. McLeod Const. Co.	14	Gilchrist	.71	.....	.....	.71	.71	S.T.R.B.	100.00
751	W. J. Bryson Paving Co.	40	Walton	7.29	7.29	7.29	.....	7.29	Sand Clay	100.00
752	W. J. Bryson Paving Co.	40	Walton	8.72	8.72	8.72	.....	.35	Sand Clay	66.05
755	B. Booth	17	Polk	11.22	11.22	11.00	.....	.....	Graded	98.00
756	State Convict Forces	19	Marion	11.89	.....	.....	0.00	0.00	S.T.R.B.	0.00
766	State Convict Forces	10	Bay	8.74	8.74	8.00	.....	.....	Graded	78.00
787	State Convict Forces	10	Walton	16.29	11.89	6.67	.....	.....	Graded	30.80
788	W. J. Bryson Paving Co.	10	Walton	17.54	14.52	10.67	.....	.....	Graded	58.00
798	State Convict Forces	13	Nassau	15.03	7.50	5.66	.....	.....	Graded	41.60
802-A	C. C. Hayes	10	Okaloosa	8.68	8.68	8.48	.....	.....	Graded	98.00
802-C	Curry & Turner	10	Okaloosa	10.24	10.24	10.00	.....	.....	Graded	95.00
803	Collins Const. Co.	10	Okaloosa	11.13	11.13	10.13	.....	.....	Graded	95.00
806-A	R. C. Huffman Const. Co.	25	Hendry	11.00	11.00	10.20	.....	.....	Graded	94.00
806-C	R. B. Stewart	25	Hendry	11.00	11.00	10.45	.....	.....	Graded	91.00
806-D	R. C. Huffman Const. Co.	25	Hendry	12.76	8.30	7.66	.....	.....	Graded	70.00
815	G. W. Byrd	54	Okaloosa	13.58	.....	.....	.....	12.86	Sand Clay	90.00
820	H. D. Spangler & Co.	96	Jefferson	9.38	5.29	1.25	.....	.....	Graded	24.00
821	H. D. Spangler & Co.	96	Jefferson	5.18	4.82	3.11	.....	.....	Graded	67.00
832	State Convict Forces	10	Santa Rosa	16.01	5.20	2.50	.....	.....	Graded	10.00
833	State Convict Forces	10	Santa Rosa	8.02	6.00	.50	.....	.....	Graded	5.00
840	State Convict Forces	115	Walton	10.45	9.08	7.00	.....	.....	Graded	60.00
842	W. J. Bryson Paving Co.	115	Walton	10.15	10.15	8.12	.....	.....	Graded	80.00
844-A	State Convict Forces	115	Okaloosa	7.10	7.10	7.10	.....	.....	Graded	99.00
844-C	State Convict Forces	115	Escambia	5.63	5.63	5.63	.....	.....	Graded	99.00
845	State Convict Forces	19	Taylor	8.57	8.00	7.50	.....	.....	Graded	78.00
841	State Forces	115	Walton	6.44	1.28	0.00	.....	.....	Graded	5.00
846	State Convict Forces	19	Taylor	11.00	5.00	3.25	.....	.....	Graded	40.00
854	G. W. Byrd	60	Walton	9.81	9.04	5.71	.....	0.00	Sand Clay	48.00
855	C. C. Moore Const. Co.	60	Walton	9.93	9.33	9.33	.....	5.33	Sand Clay	78.50
863	L. M. Gray	56	Columbia	1.48	1.48	1.48	1.48	.30	S.T.R.B.	82.35
870	S. J. Groves & Son	143	Palm Beach	10.83	0.00	0.00	0.00	0.00	S.T.R.B.	0.00
Total complete November 30, 1929					2,953.07	2,908.61	1,529.20	2,278.34		
Complete month of November					8.01	10.33	3.13	38.09		
Total complete October 31st, 1929					2,945.06	2,898.28	1,526.07	2,239.35		

TOTAL MILEAGE COMPLETE

	Concrete	Brick	B. C.	S. A.	B. M.	Asph. Block	S.T.R.B.	S.T.S.C.	S.C.	Marl	Total
Complete to Oct. 31st, 1929	322.97	17.13	39.75	114.75	109.75	23.70	1,254.50	226.39	189.92	27.58	2,326.26
Complete month of Nov.	5.15						7.93		3.28		16.36
Complete to Nov. 30th, 1929	328.12	17.13	39.75	114.75	109.75	23.70	1,262.43	226.39	193.20	28.58	2,342.62

OUR SERVICE ON

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and all other classes of Surety Bonds is unsurpassed.

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Atlanta, Ga., Branch Office, Fourth Floor, Citizens
and Southern Bank Bldg.
H. N. HUTCHINSON, Manager.

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Every printing need for the road builder, economically produced. Accuracy, quality and quick action have made for this firm an enviable reputation.

APPLEYARD'S

Foremost Printers of Florida
Tallahassee, Florida

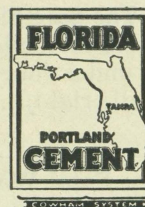
Florida Cement

EXCEEDS

State Highway Specifications

DAILY

CAPACITY



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"A Florida Product for Florida Construction"

Florida Portland Cement Co.

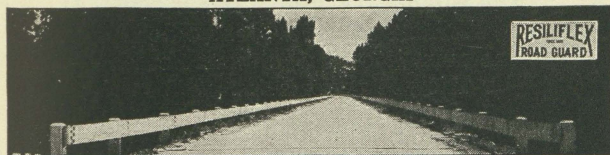
Tampa, Florida

HIGHLY VISIBLE AT NIGHT



A Guard rail that has great strength, is flexible and resilient for absorbing shocks, and has a smooth surface for gliding traffic safely along highways—Resiliflex Road Guard.

NATIONAL TRAFFIC GUARD COMPANY
ATLANTA, GEORGIA



The highway department of Michigan recently purchased \$25,000 worth of luminous red buttons to be used for signs to caution motorists at night.

Tourist traffic is Canada's third industry, ahead of the fisheries, even ahead of the mines—exceeded only by agriculture and the forest industries.

Out of the Frying Pan

Physician announces that a child who practises every day on the piano won't develop the habit of finger-nail biting. Yeah, but won't he develop the habit of practising on the piano every day—Macon Telegraph.

Pensacola Creosoting Company, Inc.

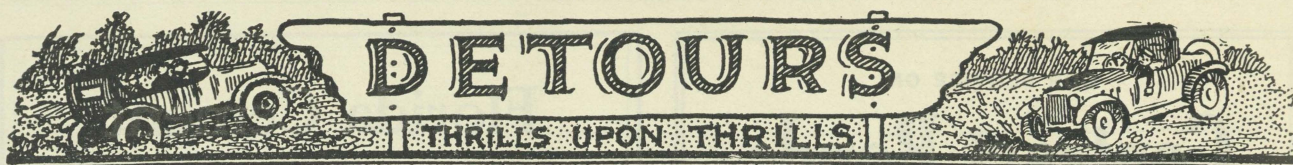
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Specializing in the manufacture and
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BER and STRUCTURAL TIMBERS

Your inquiries solicited—Cost estimates gladly
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Perfectly Satisfied.

A captious young fellow of Fla.
Was necking a wench in a ca.
Said he to his queen,
"I never have seen
A place where the women are ta."
—Yale Record.

On The Safe Side

"Are there half fares for children?"
Conductor—"Yes, under fourteen."
Father—"That's all right. I've only five."
—Pearson's.

Them Fatal Woids

Temperance Orator—"Some advocate moderation
—others demand Prohibition. What, I ask you,
really is the great drink question?"
A Voice—"What'll you have?"—Everybody's
Weekly (London).

Headlong Docility

"Does your wife really obey you?"
Darke—"Sometimes. When I say, 'Go ahead
and never mind me,' she always does."—Answers.

Hint For Travelers

To close a trunk when overpacked.
1. Lose key down the well.
2. Trunk lid will automatically slam and remain
permanently locked.—Dublin Opinion.

Friends of Silence

By means of a new local anesthetic, patients may
listen-in to radio while undergoing a surgical operation.
Some, however, firmly demand chloroform.—
London Opinion.

Dig For Dad

Little Ethel—"Mother, are you the nearest relative
I've got?"
Her Mother—"Yes, dear, and your father is the
closest."—Montreal Star.

Human Barbed-Wire

"What have you in the way of a drink?"
"Three policemen and a Federal agent."—Bean
Pot.

Sure Fire

Success Expert—"What's your name?"
Greek Client—"Gus Poppapopupopulos."
Success Expert—"Get a job selling motorcycles."
—Masonic Craftsman.

Silent Movie

Mother—"What did your father say when he saw
his broken pipe?"
Innocent—"Shall I leave out the swear-words,
mother?"
Mother—"Certainly, my dear."
Innocent—"Then I don't think he said anything."
—Montreal Star

Edifying Humility

Doctor—"The best thing for you is to stop drinking
and smoking, go to bed early and get up early
in the morning."
Patient (considers a bit)—"Say, Doc, I don't
think I'm worthy of the best; what's second choice?"
—Brooklyn Eagle.

Too Much Sister

She—"Now you pride yourself on being able to
judge a woman's character by her clothes. What
would be your verdict on my sister over there?"
He (looking at her sister's scant attire)—"Insufficient
evidence."—London Opinion.

Educating Ma

"Has your son's college education proved of any
real value?"
"Yes, indeed, it's entirely cured his mother of
bragging about him."—Pathfinder.

Give It a Name

Poor Golfer—"Well, how do you like my game?"
Caddy—"I suppose it's all right, but I still prefer
golf."—Montreal Star.

Sweet Tooth

Tramp—"Have you a piece of cake, lady, to give
a poor man who hasn't had a bite to eat for two
days?"
Lady—"Cake? Isn't bread good enough for you?"
Tramp—"Ordinarily, yes, ma'am, but this is my
birthday."—Pitt Panther.

To Put It Coarsely

"I made some very valuable contacts today."
"I didn't make any sales, either."—Life.

Shake, Brother!

The rumble seat, the humble seat
Where poor relations ride;
The rumble seat, the grumble seat—
They're never satisfied.

The rumble seat, the jumble seat,
Where folks together thrown
Discuss with heat the mumble seat
In bitter monotone.
—Louisville Courier-Journal.

Quick Turnover

Herbert—"Arthur hasn't been out one night for
three weeks."
Flora—"Has he turned over a new leaf?"
"No; he's turned over a new car."—Answers.

He Talked Back

"What happened to your face?"
"Had a little argument with a fellow about driving
in traffic."
"Why didn't you call a cop?"
"He was a cop."—Brooklyn Eagle.

PROPER BALANCE OF HIGHWAY EXPENDITURES PROVIDES FOR EVERYTHING...for PATCHING...for WIDENING ...for SURFACE TREATING...for RESURFACING...for CONSTRUCTION

Modern development of a highways system demands almost "everything."

Not just improvement of main highways... but of secondary roads as well.

Not merely expensive types of surfacing, but an intelligent division of roads into "major," "medium," and "minor" classifications and the selection of an adequate type of surface for each classification.

Not just new construction . . . but a realization that greater and greater service will be obtained from all road surfaces through wise maintenance.

Not concentration of highway funds into a few routes or into one type of construction, but wise and equitable distribution of funds where they will do the most good.

The highway official's task today is surely a job of striking a balance . . . of weighing the needs of all his roads and all his constituents . . . of weighing the merits and costs of one type against another . . . of

fitting the type of road surface to the number of vehicles per day.

He has to look with a challenging eye at any single project or any single type of construction that threatens to take more than its share of the available funds.

The use of Tarmac will enable you to balance your road program. Let us tell you about its various uses.

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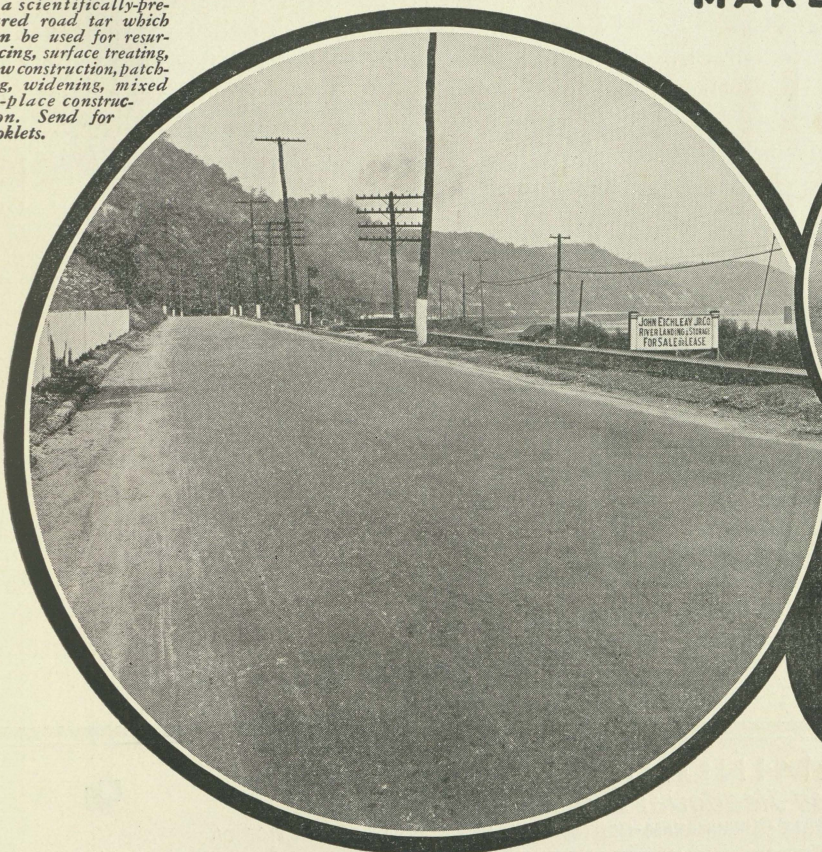
402 Masonic Temple, Jacksonville, Fla.

Tarmac

MAKES GOOD ROADS

Tarmac

Is a scientifically-prepared road tar which can be used for resurfacing, surface treating, new construction, patching, widening, mixed in-place construction. Send for booklets.



**BALANCE
YOUR
HIGHWAY
PROGRAM**

Photographs here show East Carson Street near Pittsburgh city limits. Right—Patching with Tarmac T. (Size of patches show condition of road before resurfacing). Left—After resurfacing with Tarmac.



In Orange County approximately 235 miles of this tested type of low cost paving on Lime Rock Base have been laid, in which "Ensley Basic Slag" was used exclusively as the cover material. Photo shows section of the famous Scenic Highway passing through Avalon Groves near Orlando.

GOOD ROADS at LESS COST

SLAG Surface Treatment

Too much credit cannot be given the engineers of the State Road Department of Florida, the Florida representatives of the U. S. Bureau of Public Roads and several county engineers for the work they have done during the past eight years in developing and perfecting **BITUMINOUS SURFACE TREATMENT** of lime rock, Bartow clay, oyster shell, coquina, ojus rock and sand clay, so that the maximum quantity of Florida road materials could be used in the construction of a **LOW COST ROAD** that would carry heavy traffic on the main highways satisfactorily every day in the year.

We take pride in the fact that crushed and screened "**ENSLEY BASIC SLAG**" has been used from the first in this development and that the splendid results obtained have contributed largely to the state-wide system of **GOOD ROADS** in the **SUNSHINE STATE**. More than 24,000,000 sq. yds. (equivalent to 2,260 miles) of **SLAG SURFACE TREATMENT**, the "**NON-SKID**" wearing surface, is serving traffic in all sections of Florida.

Quoting from a recently published article in "Georgia Highways" by B. P.

McWhorter, Georgia Highway Engineer, "Slag gives better results and a greater percentage of the cover material (in Georgia and Florida) is of this type.

Being cubular in form it assures an interlocking of the aggregate and a mechanical bond under the roller that we have not been able to obtain with other materials . . . and it is especially suited for this type of bituminous paving for the reason that it is free from flat or elongated pieces."

Blue-gray in color, "**ENSLEY BASIC SLAG**" proves an ideal cover material for it is non-glaring. It does not dust or fracture easily under traffic. It produces a tough, "non-skid" surface.

Good roads have been an important factor—next to an amazing climate, the most important factor—in Florida's wonderful growth. Florida road builders have saved their state millions of dollars in bringing **SLAG SURFACE TREATMENT** to its present state of perfection. The splendid condition of these roads today, after having been subjected to heavy traffic for periods ranging up to 8 years, proves this statement conclusively! Why use substitutes?



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